THE

VETERINARY JOURNAL

JANUARY, 1907.

Editorials.

GOVERNMENT CONTROL OF MALLEIN AND THE NOTIFICATION OF GLANDERS.

RECENTLY it has been our personal experience to come in contact with an instance in which the foreman of a large stud of horses has himself, with the consent of his employers, been testing the whole of the animals under his charge with mallein. It is true that in this particular case certain reactors were reported to the County Council Inspector, but they were only reported on the diagnosis of the horse foreman, and had not previously been seen by a qualified veterinary surgeon. There was no reason whatever to doubt that the intentions of the owners of these particular animals were honest, but the subject is one of such importance that it ought certainly to be thoroughly ventilated. At the present time mallein can be obtained by owners of horses without very much difficulty, and, after seeing its effect several times, it does not require very much intellect to enable a man to make a shrewd guess as to whether it is wise to keep that horse in the stud or not. If there are no clinical symptoms of glanders, an unscrupulous owner is neither compelled to notify nor yet to destroy the animal, and, unless the Inspector entered the stable unexpectedly, and actually found a decided reaction present at the time, he would have no jurisdiction; and again, even if he did find a reaction at its height, it is questionable whether, unless it could be proved that a qualified veterinary surgeon had already told the owner that the horse was the subject of glanders, the owner could not escape by pleading technical ignorance.

The remedy lies in attacking the question at its foundation, viz., the source of the supply. Mallein is only to be obtained from a very limited number of places in Great Britain, and even

that which comes from abroad might be controlled too. Its use should be legally restricted to members of the medical or veterinary professions, and an account should be compulsorily kept of how and where each dose is utilised.

Notification of glanders, too, should be made compulsory, not only on the part of the owner, but also on the part of any veterinary surgeon who obtains knowledge of its presence. At the present time the matter is left entirely with the owner, and with the meagre rate of compensation there is often a tendency not to report a case of glanders which is only discovered by the mallein test, the horse possibly being of considerable value and a new purchase. It may be that the horse is bought subject to freedom from glanders on the mallein test; this is often asked for by an owner who has experienced the ravages of an attack of glanders, and the result is not difficult to surmise. If the horse reacts, the animal is allowed to rest quietly for a few days until the mallein swelling has disappeared, and is then returned to the vendor, who simply passes the horse on to another and less particular customer as speedily as possible.

An assurance that glanders *can* be stamped out of Great Britain is readily given by all Veterinary Inspectors who have ever studied the question, but that we shall never make substantial progress as matters are administered at present is also equally certain. London is, of course, the chief centre of the disease, but it is not fair to expect the ratepayers of London alone to bear the expense of stamping out a disease the result of which will be of benefit to the animals of the whole country, and, in addition, completely eradicate one of the most fatal of all human diseases.

There are three things which would very materially assist in the efforts made to get rid of glanders: in the first place, the notification of all glandered animals should be compulsory both on the owner and the veterinary surgeon who makes the diagnosis, the latter to be paid a notification fee for each case; secondly, the Veterinary Inspector should have discretionary power to apply the mallein test to all horses to which he thinks it necessary in an infected stud, and not to be, as at present, compelled to first obtain the consent of the owner; all reactors not showing clinical symptoms should be satisfactorily isolated from the healthy animals, and should be kept under compulsory observation and report as long as the Veterinary Inspector should consider this necessary; if this be impossible they should be killed; and, thirdly, a fair compensation should be paid to an

owner who will permit a reactor not clinically affected to be killed.

At the present time, in London, an owner is allowed only one quarter of the value of the animal, and this, when a large stud is dealt with, means the direct dead loss of a very large sum, so that most owners, although there is strong reason to suspect that several of the animals which have been in contact with a glandered one would respond to the mallein test, refuse to have it applied, and the Veterinary Inspector is powerless, in the present state of the law, to enforce the matter.

COLONIAL PROGRESSION IN THE PROPHYLAXIS OF DISEASE.

As will be seen by the perusal of a further column in this month's number, our Colonies have again given us a lead. Not only in the matter of meat inspection are many of them far in advance of us, but also now in the treatment of glanders and tuberculosis. By the latest amendment to the Animal Diseases Act of Cape Colony, any animal suffering from glanders and tuberculosis can be summarily dealt with, and, what is of much more importance to the success of any stamping out measures, the in-contact animals can be dealt with too. In the case of glanders, the authorities have the power "to cause *all animals which have been in contact with infected animals, and are liable to be infected*, to be tested with mallein by, or under the supervision of, a Government veterinary surgeon or other officer thereto specially authorised in writing by the Minister, and to be isolated under quarantine." In the case of tuberculosis, all visibly affected animals are to be immediately destroyed or *permanently* isolated under quarantine, compensation not exceeding one fourth of the value of the animal before infection to be paid to the owner ; and, secondly, *all animals which have been in contact and are liable to be infected are to be tested with tuberculin*, and, if reacting, to be isolated under quarantine.

The italics are ours, and they particularly emphasise a great advance in the prophylaxis of glanders and tuberculosis, an advance which it will be necessary for the authorities in Great Britain to adopt when the time comes at which they can see their way clear to seriously take in hand the eradication of these two animal scourges.

THE QUACK MEDICINE VENDOR.

THE subject of the quack medicine vendor has from time immemorial been a sore one with the qualified practitioner, whether human or veterinary, and the motion recently brought by Mr. Livesey before the members of the Southern Counties Veterinary Medical Society is worth consideration. We are all agreed we should like the general public to come to the qualified man whenever occasion for the administration of physic arises, quite as much, probably, for personal pecuniary reasons as because we imagine it would be an additional safeguard to the lives of our patients. That such an ideal will never be attained is very certain, and we of the veterinary profession do not in reality suffer any more in this direction than do our medical *confrères*. In free countries such as England and America, a law to compulsorily force a man to purchase remedies either for himself or his animals from one source only—viz., the qualified man—would never be tolerated, and experience is the only teacher which brings back an erring client to the fold.

If it were really advisable and necessary to compete with such men, the question of professional dignity would have to be thrust on one side, and we should have to enter other lists of competition against them, using our qualifications as an additional aid. That, however, is a course we are sure the administrative body of our professional affairs will never allow, and any man deliberately carrying out such a course would not only be ostracised, but would at once be struck off the Register. One unfortunate part of the quack medicine vending company business is, that in several instances duly qualified men holding the Diploma of the Royal College of Veterinary Surgeons, and able to verbally utilise the weight given by the letters M.R.C.V.S. when necessity arises (clients being judiciously informed by the agent at a show that "our Mr. —— is a Member of the College, and supervises all the manufacture of our medicines and liniments, &c."), are allowed to be proprietors or large shareholders in quack medicine firms, and at the same time to keep their names on the Royal College Register. Such a thing as this seems, to say the least of it, inconsistent, and in direct contradiction to the motto of "*Vis Unita Fortior*," which they, as members of the veterinary profession, are legally entitled to use. It ought not to be possible for members of a learned scientific profession to be proprietors of a quack medicine vending company, and at the same time have their names inscribed in the official Register.

ANTI-TUBERCULAR SERUM.

ACCORDING to Ravenel's report to the Henry Phipps Institute, reproduced in another column of this Journal, both Maragliano and Marmorek have produced a serum with immunising properties, at any rate as far as experimental animals are concerned. The experiments quoted in each case would appear to definitely establish this fact. But what conclusions are we to draw as to the curative properties of these sera? We have no records at hand dealing with that aspect in the case of Marmorek's serum, but the few cases of human tuberculosis treated with Maragliano's serum, as recorded by the Henry Phipps Institute, afford food for reflection. In each of these cases no good results were observed attributable to the serum, while local inflammatory phenomena, with the inevitable discomfort, were produced in four out of five cases at the seat of injection. We admit that the number of cases is too small to justify general conclusions, but we feel quite justified in adopting Ravenel's conclusion that the "curative value of his (Maragliano's) serum is not so well established" as its protective value, which, he says, "from a laboratory standpoint cannot be contested."

Original Articles.

VETERINARY EDUCATION AND EXAMINATIONS.

CONSIDERED BY A SENIOR STUDENT.

THAT the above subject, which has now been under discussion for a considerable time, is of great interest to the Veterinary Profession, is evidenced by the amount of correspondence to which it has given rise in the Veterinary periodicals—especially the VETERINARY JOURNAL—during the last twelve months. In the first instance, the subject was brought forward by certain members of the profession who consider that the present method of Examination is not one which, from the nature of it, is likely to have a truly beneficial effect upon the general education of the Veterinary Student, and thus probably assert an adverse influence upon the profession as a whole.

Some who seek for a reform, have suggested that a more commendable system would be one which would include the teachers on the Examining Board, and have shown wherein lies the evil of the present system. When it is proposed that an alteration is needed in a system which has been in vogue for many years, one naturally expects the suggestion to be met by opposition. It is, however, somewhat surprising that the views of those who have urged the need of an enquiry into this question have been totally misinterpreted by those who are opposed to any alteration in the present method of conducting the

examinations. For instance, "Observer" is evidently under the impression that an attack is being made upon the One Portal system, and that any alteration of the present method must of necessity endanger and weaken that most excellent condition whereby the Veterinary Profession is entered by one gate only. "Observer" clearly suspects that a movement is on foot which, if brought to a successful issue, would empower each Veterinary College to examine its own students, and, practically, to grant its own diploma. Nor is "Observer" alone in this suspicion. But surely this is a grave misconception; for, as is evident from their contributions, those who complain of the present system very strongly uphold the single portal, and have no desire to see its present great strength in any way reduced. That it need not necessarily be weakened or in the least affected if the present method be improved upon is of crystal clarity. Furthermore, since the discussion was first opened some contributors have stated that they see no reason to alter the present system, and "Observer" at the conclusion of his contribution to the discussion says: "I am therefore forced to the conclusion that until some scheme is brought forward, backed by weighty and convincing evidence of some unfairness or weakness in the present system, we should be content to leave 'well enough' alone, and not seek another method simply because the medical profession has favoured it."

Since then, some members of the profession cannot or will not see the urgent need of a reform in Veterinary Education and Examination (the two are inseparable), the writer feels compelled to take a part, for the first time, in the discussion of this fundamentally important subject, and will endeavour to show that there *is* a very definite cause for complaint, and that "some powerful reason for promoting a change in a system of examination which has been in vogue for a long period" can be brought forward.

Let us, in the first place, consider the various possible methods of conducting examinations, and the possible composition of the Board of Examiners. There are three methods: (1) The Examining Board may be composed entirely and exclusively of *outside* men. The teachers thus have no voice in the matter, and are not consulted at all as to a student's fitness. (2) The teacher of each subject may examine his own students, no outside examiners being employed. (3) The examiners in each subject may be two in number, one of whom is the teacher of the candidate and the other an external examiner; the external examiner being, where possible, also a teacher.

The first of these methods, which is the one at present in use, has certain disadvantages and certain advantages. It has been asserted by some that the advantages considerably outweigh the disadvantages, and that the faults which are claimed to attach to this system are either non-existent or insignificant. This surely is a mistaken idea. It is a recognised and well-known fact that, in any institution where the examinations are conducted exclusively by outside examiners, there is sure to be a certain amount of false education and cramming; for, in spite of the endeavours of the individual teachers, the students themselves will think continually throughout the session of the approaching examination. The fact stands continually before them that if they cannot answer a certain

number of questions correctly and to the examiner's satisfaction in the brief space of twenty minutes or so they will be rejected. The examiners in that space of time are supposed to find out how much or how little a student knows—a whole session's work condensed into about half an hour! It is absolutely impossible for a stranger to form a correct conception at the end of that short time as to whether a student is fit or not to proceed with his studies. The examinations are thus a mere lottery, and both students and teachers know it. Whether the examiners themselves honestly think that they can form an absolutely correct opinion as to every candidate's fitness is for them to say. How often do we find students rejected under this system who, if one of the examiners was their teacher, would be passed; and, on the other hand, how many men get passed either by a "fluke" or because they have employed that abominable method of "cramming" during the last quarter of a session. Such men, who can never be a credit to the profession, would find it far more difficult, if not impossible, to dodge past their examinations were their teachers on the board.

Under this system students dare not try to take a wider grasp of any subject than is barely necessary to meet the requirements of their examiners. If they do go off the beaten track and endeavour to obtain a deeper insight into any science which especially appeals to them, they very seriously jeopardise their chance of going through the ordeal of examination successfully. Under these conditions education is bound to be narrowed down to mere spoon-feeding, and students will think more of the examination than of the actual education they are supposed to be acquiring.

The advantages of educating men along the lines of research and in the laboratory over the method of exclusively teaching and spoon-feeding in the lecture hall, have been shown by "Syntax." Has it ever occurred to those members of the profession who are satisfied with the present condition of education and examination, what a relatively small amount of research work is carried out in the various Veterinary Colleges in this country, and what is the ultimate effect of debarring students—as the present examination method most assuredly does—from taking an interest in laboratory work? How comes it to pass that practically all advances in veterinary science are either imported from the continent or are adaptations of the methods employed in the so-called "sister" profession? How comes it to pass that it is not infrequently found necessary to apply to the medical profession for men sufficiently well educated on scientific lines to teach veterinary physiology, veterinary pathology, and other subjects? Is it because the average veterinary surgeon is intellectually inferior to the medical man, or is it that he is merely deficient in laboratory training, as a consequence of his education at college having been, for the most part, spoon-feeding? Those who cry "let well enough alone," should ponder these questions and draw their own inferences.

The second-named method of examination, namely, that by which each teacher would examine his own students in the absence of an external examiner, is one which has nothing to recommend it. It would mean, if practised, that each college would grant its own diploma, and thus the One Portal system would be done away with, a most undesirable condition. The method therefore can be thrown out

of consideration; it has not, so far as the writer is aware, been suggested by those who seek reform.

The third method mentioned is the one which seems to approach nearest to a state of idealism. It is the system which has been adopted by the University of London for the examination of candidates for the veterinary degree; it possesses advantages over the present system which must be at once apparent to anybody who has seriously considered this vitally important subject of examinations. We entirely fail to see that any argument can be brought forward showing that it should not supplant the present method. The teacher knows what work his students have done, and he is in much the best position to judge as to the fitness of any candidate to proceed with his studies. The presence of an external examiner would ensure that each student would receive an impartial examination, and at the same time uphold the integrity of the One Portal system.

It has been suggested that teachers would endeavour to pass as many of their pupils as possible, whether fit or unfit. Now, this implies one of two things; either that the system employed by universities is entirely at fault, or that the moral standard of the veterinary teacher is decidedly lower than that of the teacher in universities. No teacher having even a small amount of self-respect would hesitate either to reject an unfit candidate or to pass a man knowing him to be deserving of that honour.

If the suggested method were to be adopted, cramming would at once be done away with and "slackers" would be compelled to work systematically throughout the session. It is a well-known fact that "slackers" who have merely crammed at the end of the session would far rather face two external examiners on the chance of fluking through —which many of them do—than have to be examined by their teacher. Surely this is a much more commendable system than the one at present in vogue?

The subjects, as well as the methods, of examination cry out for the careful consideration of the Council of the Royal College of Veterinary Surgeons. The subjects of stable management and hygiene have been so well discussed by Professor Craig that it may be perhaps unnecessary to again comment upon them; but the teaching and examination of stable management is in such an unsatisfactory condition, and is the cause of so much discontent and ill-feeling, that too much stress cannot be laid upon the need for an enquiry into it. Stable management, as is well known, ranks, from an examination point of view, exactly equally with physiology and anatomy—two of the most difficult and important subjects in either the medical or veterinary curriculum. Intellectually it ranks lowest of all the subjects of the veterinary course. Beyond, perhaps, some few points in shoeing—which can only be learned practically—any third class "strapper" from a jobbing stable could pass the examination with honours; and *such* a "subject" is placed by veterinarians on an equal footing with those which require no small amount of intellect to acquire! It is a scandal and a shame that because a student may not be able to talk stable jargon or put on a night bandage sufficiently well, he can be, and frequently is, rejected, though he may have passed with honours in both physiology and anatomy. We were not all brought up on farms or in stables, and the stable management that we learned (?) in class B was simply crammed

into us for the one and only purpose of getting us through the examination.

It appears to the present writer that stable management is not a suitable subject either for teaching or for examination. The knowledge which is really necessary for the veterinary surgeon will either be picked up without effort as the student proceeds towards his final examination, or, if this is not done, the student is not made of the stuff which goes to the composition of a veterinary surgeon of the right kind.

Anatomy is another subject in urgent need of consideration. According to the present requirements of the Royal College of Veterinary Surgeons, the teacher of anatomy is practically compelled to make two subjects out of one. The splitting off of "junior anatomy" from the rest has not one point to recommend it. It is illogical; it is unpractical; it is contrary to the interest of the student. The student in class A can have only a feeble notion as to the purpose and meaning of the surface-markings of bones. The student of class B has all too often forgotten that such markings exist. The present writer was told recently of an illustration of the last assertion. It is stated on authority, the authenticity of which cannot be doubted, that, in a practical anatomy class of over thirty men, not more than half a dozen had remembered the name of the ilio-pectineal eminence. The actual eminence was pointed out to each individual member of the class, and its name and purpose asked for, with the result just mentioned.

Again, in most subjects of examination specialists are elected examiners. Chemistry is examined upon by chemists; botany by a botanist; zoology by a zoologist; physiology by physiologists; pathology by pathologists. Anatomy, no less scientific a subject than those mentioned, on the other hand, is not held in sufficient regard to have specialists appointed as examiners of its students. In the medical profession—though it is dangerous to quote the "sister" profession as an example—anatomy is regarded as having a two-fold value. First, and *most important to the student in the earlier years of his course*, it has an educational value second to that of no other scientific subject. Secondly, and to the more advanced student, it is the real organic basis of medicine and surgery. In the first and second years of the curriculum, the student is presumably laying an educational foundation for the *subsequent* erection of a superstructure of professional knowledge. It appears that the Royal College of Veterinary Surgeons are unaware of the danger—or should we say impracticability—of rearing the upper part of a building upon an insecure foundation. At any rate, it seems fair to presume that this is so in view of the fact that general practitioners, and not specialists, are appointed to examine students of classes A and B in anatomy. Some time ago it was recognised that it was not always for the best to appoint practitioners as examiners in what may be termed the more purely scientific subjects. But in the revolution which resulted in veterinary surgeons being superseded as examiners in chemistry, botany, physiology and pathology, anatomy was overlooked. Even if it is the case, as seems possible, that the Royal College of Veterinary Surgeons look upon anatomy as being purely utilitarian, then the present arrangement is only partly correct. For if anatomy is to be considered as merely an adjunct to surgery, the sooner this is candidly acknowledged the better. Then anatomy could

be taught in a very short space of time, for veterinary surgery is not so extensive as yet as to require a very considerable amount of anatomical preparation. Consider the number of operations performed by even the most advanced of our surgeons, and then consider the amount of anatomy required by the *average* practitioner.

One has been led to discuss anatomy at some length because it appears that the teachers of veterinary anatomy are themselves afraid to express candidly their opinions.

In conclusion, the writer would like to draw attention to the fact that the only method by which the exceedingly important subject of examinations can be beneficially discussed and satisfactorily settled is by bringing forward definite facts and arguments for or against an alteration in the present system. To merely state that one sees no need for interference, without producing arguments, and to talk about apeing the medical profession, tends to clear up the matter neither one way nor the other, and the value of such "opinions" is about equal to that of the ink used to express them.

CRYPTORCHID CASTRATION.

BY J. F. CRAIG, M.A., M.R.C.V.S., PROFESSOR OF ANATOMY, ROYAL VETERINARY COLLEGE OF IRELAND, DUBLIN.

My chief object in dealing with the subject of cryptorchid castration is to describe the anatomical areas involved, but I think it will make the article more interesting if I include the details of the condition and operation.

In the fœtus the testicles are formed from the genital ridge at the roof of the abdomen behind the kidneys. During development, each testicle descends towards the abdominal ring of its own side, and passes through the inguinal canal, dragging with it a *cul-de-sac* of the peritoneum, the tunica vaginalis. This descent is directed by means of a fibrous cord attached to the testicle, the gubernaculum testis. In the foal at birth, or within six months afterwards, the tesicles have reached the scrotum. In some animals the descent is delayed, and the testicles may not appear in the scrotum until the first, second or third year. In a few cases they remain in the abdomen or the inguinal canal throughout life.

The term "cryptorchid" is applied to an animal in which the testicles have not reached the scrotum. When only one testicle is present in the scrotum, the animal is called a "monorchid." Strictly speaking it is not so, but that term is usually taken as being synonymous with "rig." A rig is a horse in which one, the scrotal, testicle has been removed, and the other lies in the inguinal canal or abdomen. For our purpose we will regard the three terms as being identical.

Cause or Causes of the Condition.—These are not well understood. In a few cases the condition may be explained by the appearance of a cyst or tumour in the testicle, which increases its size and so prevents its descent. However, in a large proportion of cryptorchids, the testicles are smaller than normal. One might refer to the

abnormally short attachment of the testicle within the abdomen, or to a short vas deferens, or even to a narrow inguinal canal as producing the abnormality, but these conditions have themselves to be explained.

Heredity.—It is worthy of note that some sires leave a large number of their offspring cryptorchids, indicating that in some cases the condition is hereditary. A case is cited by Müller in which five of the progeny of a stallion with both testicles retained were either cryptorchids or monorchids. It has also occasionally been recorded that this condition has been transmitted by the mare. Hobday refers to one case in which a mare gave birth on successive occasions to cryptorchids from different sires.

Fertility.—It is often said that a cryptorchid is barren, but from all accounts that is not always the case. However, it is well known that a large proportion of the cryptorchids used for stud purposes have been found practically useless. As evidence against the fertility of cryptorchids, the rudimentary nature of many of their testicles might be referred to. In section it has been shown that the seminiferous tubules are badly developed. At the same time, spermatozoa have been identified in a large proportion of the specimens examined, but that cannot be taken as showing that the animals from which they were taken would have proved useful sires. Spermatozoa abound in the semen of hybrids, and yet these animals are usually sterile. The number of cryptorchids seen year by year is also noticed to vary very considerably.

Diagnosis.—The cryptorchid is usually recognised by the history of not having been previously castrated, and of no testicles being present in the scrotum, or in the case of a rig of having had only one, the scrotal, testicle removed. The animal becomes restive, and even unmanageable, in the presence of mares, especially in the spring months. By referring to the condition of the inguinal region, which I will note later on, the diagnosis will be confirmed. In some cases the owner is unaware of the previous history of the animal, and may be of opinion that it has been castrated until the symptoms above indicated are shown. Then an examination of the inguinal region requires to be made in order to confirm the opinion.

Time for Operating.—It is best to put off the operation till the third or fourth year of the animal's life, because in some early cases of cryptorchidism, the testicles reach the scrotum by the second or third year. At the same time, some special reason, such as viciousness of the animal, may necessitate the operation before that age. The time of year makes little difference in the success of the operation, provided the hygienic surroundings, such as house accommodation, be good.

Preparation of the Patient.—For operation purposes the animal is best in poor condition. He should receive very limited rations (chiefly green food and laxative diet) for a day or two prior to operation, so as to leave the abdomen as empty as possible. On the day of operation no food and only a little water should be offered.

Preparation of Instruments.—The instruments required include a sharp scalpel, dressing forceps, two pairs of artery forceps, an ecraseur with two chains in case of accident, needles and silk, two towels and some cotton-wool. These must be boiled in water for ten or fifteen minutes. Three clean vessels are needed for holding antiseptic solutions

(two for 2½ per cent. carbolic lotion, and a third for 2 per cent. creolin lotion). Of the first two vessels, one is required for the instruments and the other for holding the antiseptic lotion for washing the area involved, and for the treatment of the wound during the operation. Some of the sterilised cotton wool is used also for the latter purpose as a sponge. The creolin solution is employed for the preparation of the area, as well as a sterilised sponge, nail-brush and soap.

Method of Casting.—This is very important. Various means are taken to secure the patient, such as side-lines, hobbles, or both, depending on the preference of the operator. In most cryptorchid operations in this country the animal is put on his back; on the continent the side position is also adopted. The latter does not make the operation so easy to the operator. In the position in which the animal is placed on his back, the hind limbs are separated as much as possible to give the operator room to work. In the older patients the animal is frequently put down with hobbles, the chain slackened, and the side lines put on in the usual way. Then the hind fetlocks are connected together by a rope which passes over the back, and the right and left metatarsi further connected in a similar way. Thus the hind limbs are well separated. One of the best means of securing the patient has been lucidly described by Mr. Donald of Wigton in the *Journal of Comparative Pathology and Therapeutics*, vol. i., p. 334. When the animal is on his back, he is supported at the sides by bags of straw, and then chloroformed. The place chosen for casting should be either an open grass field or a clean straw bed in the open, or a roomy loose-box.

Operation.—As the animal is being anæsthetised the operation area should be attended to. The dirt must be removed from the feet of the horse, and after the operation area has been prepared the hind limbs are covered with the sterile towels, which are further saturated with carbolic lotion, to prevent the operation wound from becoming infected. Any long hair of the region is removed with scissors. The skin of the penis, the scrotum and groin must be washed well with soap and creolin solution, and later douched with the carbolic lotion. The hands of the operator must also be carefully prepared, the nails cleaned, and the hands thoroughly scrubbed with soap and creolin solution and then rinsed in the carbolic lotion. When the area is ready, the exact site of the operation must be chosen.

Anatomy of the Area.—Along the middle line from the opening of the prepuce to the anus, a dark line or raphé extends. The scrotum, when present, is crossed by this line about 7 inches behind the opening of the prepuce. In the cryptorchid there is no sac representing the scrotum. The gelding is easily distinguished from the cryptorchid by the fact that there is a small scar about 1 inch on either side of the median raphé, about 6 or 7 inches behind the opening of the sheath, and it is lodged in a digital depression produced by the traction of the spermatic cord upon the skin, to which it has become attached. Sometimes a scar is present over this point, indicating the position of a former operation, but if the depression be not present, then the operation has probably not been successful. Again, where castration has been performed, as a rule, the remains of the spermatic cord may be traced from the cicatrix to the external abdominal ring. In passing the hand over this area outwards from the median raphé along the line of junction of the thigh and abdomen, one first meets a prominent

ridge, which connects the side of the fore part of the prepuce with the inner aspect of the thigh. This is formed by a subcutaneous, strong, yellow, fibrous cord. Further outwards is a sharper ridge directed from the abdomen to the thigh. This ridge marks the outer boundary of the external abdominal ring, and lies about 5 inches from the middle line. In the flexed condition of the limb these ridges can be felt but not seen; they can only be shown up when the limb is extended (see fig. 1). The inner commissure of the ring may be made out only in animals in poor condition at the side of the prominence formed by the penis, and near the meeting of the penis with the thigh. If the

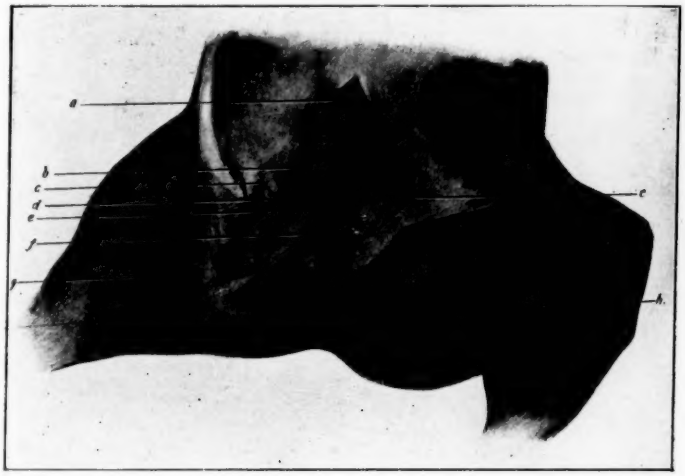

FIG. 1.—Surface Anatomy.

(*a*) Opening of the prepuce.
(*b*) Median raphé.
(*c*) Site of incision for castration of cryptorchids shown by the dotted line.
(*d*) Outer boundary of the external abdominal ring.
(*e*) The ridge which crosses over the external abdominal ring from the side of the prepuce to the thigh.
(*f*) Depressions indicating the scrotum at the points at which it was opened in castration.
(*g*) The off hind limb extended.
(*h*) The near hind limb flexed. The difference in appearance of the two inguinal regions in the figure is due to the difference in position of the limbs, *i.e.*, one being extended and the other flexed. The drawing is made from a gelding.

hand be passed upwards along the inner side of the thigh towards the abdomen to the inner side of the outer ridge, the fingers may be pushed for some distance through the external abdominal ring into the inguinal canal. Thus the canal can be explored to discover the presence of a testicle within it. By paying attention to the above guide lines one can ascertain on which side the testicle has not been removed, and whether the inguinal canal does or does not contain a testicle. The examination is very satisfactory only when the animal is in poor condition. When the animal is fat, a large amount of adipose tissue is found in this region. In animals in poor condition also the superficial inguinal lymphatic glands can be felt as a small irregular mass

at the side of the prepuce in front of the external abdominal ring. The skin over this area is thin, dark, pigmented, and only sparsely covered with hairs. It contains large numbers of sebaceous and sweat glands. Underneath it, and especially along the side of the prepuce, there is a considerable amount of fibro-fatty tissue. This tissue partly obscures the external abdominal ring and covers the veins, arteries and nerves in the neighbourhood.

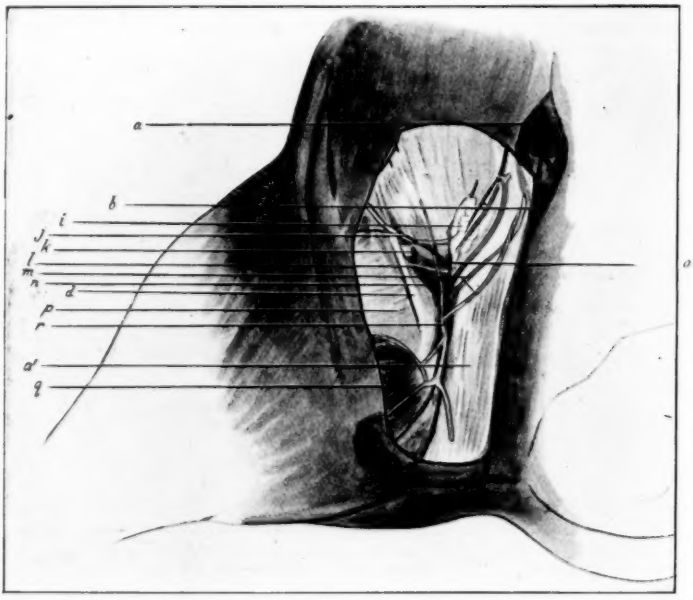

FIG. 2.—Subcutaneous Dissection.

(*a*) to (*h*) as in fig. 1.
(*i*) Superficial inguinal lymphatic glands.
(*j*) Vein and small artery which cross in front of the external abdominal ring
(*k*) Spermatic cord.
(*l*) Inguinal nerve.
(*m*) Plexus of veins which pass to the formation of the external pudic vein at the inner side of the external abdominal ring and at the side of the prepuce.
(*n*) External pudic artery at the inner commissure of the external abdominal ring.
(*o*) Subcutaneous abdominal artery.
(*p*) Fascia covering the sartorius muscle and inner aspect of the anterior half of the thigh, attached above to the posterior boundary of the external abdominal ring.
(*q*) The gracilis muscle.
(*a*^{1}) The suspensory ligament of the prepuce.

The external abdominal ring is the outer opening of the inguinal canal. It is slit-like in shape, and directed forwards and outwards. Its inner angle or commissure is placed at the side of the penis and prepubic tendon about 8 inches behind the opening of the prepuce. The outer angle may be ascertained as already indicated in the living animal. The length of the opening varies considerably; in the average case it is about 4 inches. The posterior boundary of the

ring is formed by the lower border of Poupart's ligament, the reflected portion of the external oblique tendon. This ligament is continuous below with the fascia of the inner side of the thigh. Hence the hand, passed along the inner side of the thigh, at the point already mentioned, can be pushed directly into the inguinal canal. The anterior pillar or commissure of the external abdominal ring is formed by the fleshy belly of the internal abdominal oblique muscle. This muscle is exposed for a distance of 1 or 2 inches in front of the ring. At either commissure of the ring the thin tendon of the external abdominal oblique muscle joins Poupart's ligament. Through the ring pass the external pudic artery, a small vein, the inguinal nerves and lymphatic vessels.

Blood-vessels.—The external pudic artery leaves the inguinal canal at the inner commissure of the external abdominal ring, and after a course of 2 or 3 inches outside the ring over the penis, it divides in the midst of a plexus of veins into the subcutaneous abdominal artery and the anterior dorsal artery of the penis.

The subcutaneous abdominal artery passes forward at the side of the prepuce in company with a satellite vein through the substance of the superficial inguinal lymphatic glands, and separates into several branches close to the opening of the prepuce. One small vessel detached near the origin of the subcutaneous abdominal artery or directly from the external pudic, courses outwards immediately in front of the external abdominal ring, in company with a large vein in the direction of the forepart of the thigh, and passes over the external commissure of the ring.

The anterior dorsal artery of the penis passes to the dorsal aspect of that organ over a plexus of veins, and there divides into an anterior branch, which is directed in a flexuous manner along the free portion, and a posterior branch which travels backwards along the fixed portion of the penis.

The veins of this area are large and form a rich and complicated plexus near the inner commissure of the external abdominal ring. Two or three vessels begin near the opening of the prepuce and run backwards and outwards along the sheath towards the external abdominal ring, where they join the large veins passing forwards from the back of the thigh at the side of the penis. Sometimes a branch from the internal saphena vein joins the plexus. Another large vein begins near the anterior border of the thigh, and passes inwards over the outer commissure of the external abdominal ring in company with a small artery already mentioned, and in front of the ring to unite with the venous plexus. This plexus of large veins goes to form the external pudic vein on the inner aspect of the external abdominal ring and behind the external pudic artery. The main portion of this vessel pierces the tendon of origin of the gracilis muscle about 1 or 2 inches behind the inner commissure of the external abdominal ring and enters the femoral vein. A small branch only usually ascends in the inguinal canal, in company with the external pudic artery.

The inguinal nerves and lymphatic vessels leave the inguinal canal alongside the external pudic artery. One nerve, however, passes outwards near the outer commissure, and thence forwards and inwards towards the side of the prepuce.

Were the spermatic cord in position, it would pass out of the inguinal canal near the centre of the external abdominal ring.

The depth of tissue over the external abdominal ring, especially in its outer half, is not more than 2 inches, even in fat subjects.

The *inguinal canal* is an oblique passage in the abdominal wall. It is not more than 3 or 4 inches in length from its inner opening, the internal abdominal ring, to its outer opening, the external abdominal ring. It is slightly curved in its course, the concavity of the curve being directed forwards. In the position in which the animal lies on his back, the canal leads downwards, forwards and slightly outwards from its outer to its inner opening. This passage is flattened from

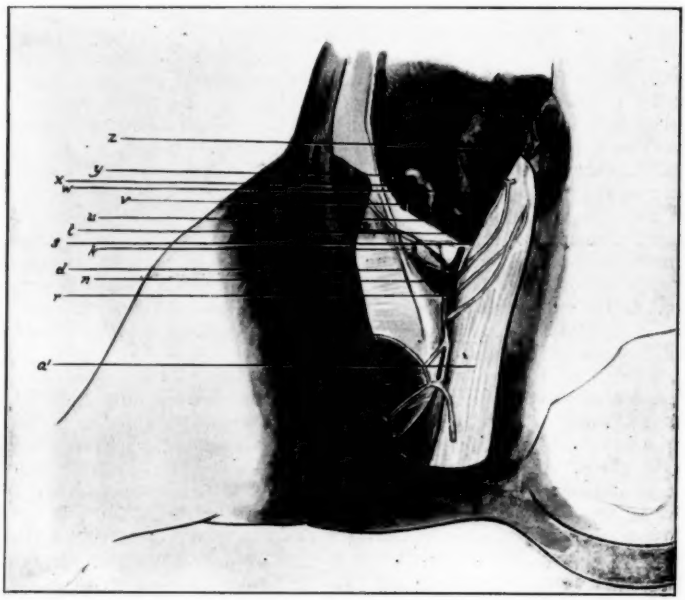

FIG. 3.—Deep Dissection.

Fig. 3 shows the abdomen opened, and the intestines, with the exception of the rectum, have been removed. Douglas' fold and the bladder have been slightly drawn forwards to the entrance of the pelvis.

(*a*) to (*q*) as in figs. 1 and 2.
(*r*) Anterior dorsal artery of the penis.
(*s*) Abdominal floor.
(*t*) Urinary bladder.
(*u*) Douglas' fold.
(*v*) Posterior abdominal artery.
(*w*) Vas deferens.
(*x*) Opening into the abdominal cavity from the inguinal canal during cryptorchid castration.
(*y*) Abdominal opening of the tunica vaginalis.
(*z*) Rectum.

before to behind, and is usually 3 or 4 inches wide. The width decreases towards the abdominal opening. The anterior boundary is formed by the fleshy belly of the internal abdominal oblique muscle, and the posterior boundary by the strong fibrous membrane which comprises Poupart's ligament. The anterior wall separates the canal from the abdominal cavity. It decreases in thickness from the

external to the internal openings. At the external ring it is from ¾ to 1 inch thick, and is chiefly made up of the internal abdominal oblique muscle, together with the thin transversalis abdominis and the peritoneum. The fibres of the internal abdominal oblique muscle are directed from the external angle of the ilium to the prepubic tendon, *i.e.*, transversely in front of the canal. The external pudic artery, the small vein and the inguinal lymphatic vessels and nerves lie along the inner margin of the passage. When present, the spermatic cord enclosed in its serous membrane, the tunica vaginalis, occupies the central portion of the canal. The remaining space of the canal is filled with loose connective tissue, which binds together the various structures passing through it. This connective tissue is broken down when the hand is being forced through the canal.

The internal abdominal ring lies at the inferior third of the side of the entrance to the pelvis, about a hand's breadth from the middle line of the pelvic floor. It is covered with peritoneum, so that in order to reach the abdominal cavity from the inguinal canal, the serous membrane must first be pierced. The "ring" is a slit-like opening or cleft, which is smaller and not so well defined as the external opening. Its posterior and outer boundary is formed by the edge of the internal oblique muscle, and its anterior and inner border by Poupart's ligament as the latter passes over the sublumbar muscles. In front of the ring lie the intestines, especially the small intestine, and on the left side the second and third portions of the double colon and the small colon. The external pudic artery enters the ring on the inner side, and in company with the small vein, the lymphatic vessels and inguinal nerves. The prepubic artery divides at the inner side of the internal abdominal ring into the external pudic artery and the posterior abdominal artery. This latter vessel courses forwards and outwards above the internal abdominal oblique muscle, along the abdominal floor in front of the inguinal canal.

The constituents of the spermatic cord, when present as in the inguinal cryptorchid, meet at the entrance to the inguinal canal. The opening into the pouch of the peritoneum (tunica vaginalis), which encloses the cord, is here seen about the centre of the ring. It will usually admit the entrance of a single finger. The structures entering into the formation of the cord are the spermatic vessels and nerves, the artery and vein of the cord, the vas deferens and the cremaster muscle. The spermatic vessels and nerves lie along the anterior free border of the cord and the vas deferens and cremaster muscle form the posterior portion of this structure. The vas deferens is continuous with the epididymis. It is a tube about the thickness of a goose-quill. From the internal abdominal ring it is directed backwards and upwards to reach the dorsal aspect of the urinary bladder in the pelvis. Through its course in the pelvis it is attached to the side walls of the cavity by means of a short peritoneal fold. Above the bladder it becomes united to its fellow of the opposite side by means of a triangular double fold of peritoneum (Douglas' fold). This fold lies between the rectum and the bladder. In all cases of cryptorchism this position of the vas deferens within the pelvis is fairly constant, and advantage may therefore be taken of it for ascertaining the position of the testicle in difficult cases of cryptorchid operation.

In abdominal cryptorchids rectal exploration is of service in the

preliminary examination of the animal, and afterwards, during the operation to gain some information with regard to the position of the testicle. The internal abdominal ring should first be identified, and then the pelvic wall examined from that point backwards. The testicle may occasionally be recognised in this way, especially if it lies near the entrance to the canal. The testicles of inguinal or abdominal cryptorchids are usually very flabby, and not infrequently smaller than normal. A flabby abdominal testicle is difficult to distinguish from bowel unless carefully examined. Its limits are better defined, and the corrugated feel of the blood-vessels and the epididymis are marks of identification. Sometimes these testicles are large and contain cysts. In a horse examined in the standing position, the testicle may escape observation even though the inguinal canal is explored with the hand as high as possible, yet when the animal is put on his back, manipulation reveals the presence of the testicle in the canal. Again, one of the scrotal testicles may be so small that it is only when the region outside the external abdominal ring is examined after the horse has been put down that it is recognised. This is especially the case when the other testicle is exceptionally large. Occasionally the epididymis lies in the canal enclosed in the tunica vaginalis, while the testicle is situated in the abdomen. The abdominal testicle is always attached to the abdominal roof or side-wall of the pelvis by a peritoneal fold. It usually lies near the internal abdominal ring, sometimes in the pelvis, and occasionally a little way behind the kidney. Rarely it has been noted near the diaphragm.

Incision.—One must first make perfectly certain that the testicle is inguinal or abdominal in position by the methods above described. The outer limit of the incision should be chosen about 5 inches from the middle line, and about 6 inches behind the level of the opening of the prepuce over the outer boundary of the external abdominal ring. Thence the incision should be carried backwards and inwards for a distance of about 4 inches (sufficient to admit the entrance of the hand) immediately in front of the line of meeting of thigh and abdomen. The depth of incision required to reach the external abdominal ring is usually not more than 1 inch. The only care which requires to be taken is of the large vein and small artery which lie in front of the ring. The plexus of veins and the external pudic artery are not interfered with. One may first incise the skin and subcutaneous fascia with the knife, or tear through the latter with the fingers, taking care of the small artery in front of the ring. The knife is then laid aside, and the hand, arranged in a cone, is used for exploration of the canal. If the testicle be inguinal in position, it is easily reached, surrounded by the tunica vaginalis, taken up and excised by means of the ecraseur. It is well to be certain that the testicle and not the epididymis alone is being removed. If the latter alone be found in this position, the abdominal cavity must be searched. If the testicle be abdominal in position there are two methods of operating.

(1) *The Belgian Method.*—After cutting down upon the external abdominal ring as above noted, the hand alone is used to open into the abdominal cavity. The fingers of the hand are arranged in the form of a cone, and by a semi-rotating and propelling movement thrust through the canal, breaking down the loose connective tissue in the way. The direction of the canal is to be carefully noted. The elbow

of the operator on that account is directed towards the pubic symphysis, and the fingers of the same arm pointed towards the external angle of the ilium of the side operated on. When the internal abdominal ring is reached, the hand will have been passed through the skin wound to near the base of the thumb. Then the bowels are felt through the peritoneum in front of the canal. By passing the hand through the canal in this way, the vessels along the inner margin of the canal are avoided. The peritoneum is then punctured with the finger to the outer side of the internal abdominal ring. The opening is thus enlarged by tearing, in order to admit at first of the entrance of two or three fingers. These fingers are inserted into the abdominal cavity to search for the testicle near the internal abdominal ring. The testicles are frequently found near or at the entrance to the pelvis, and on that account the operator should not be in a hurry to make the opening into the abdominal cavity any larger than he can help. Care should be taken to examine the ring at the inner side of the surgical opening for any evidence of a neck of a tunica vaginalis which may have escaped detection in the passage through the inguinal canal. If the testicle cannot be found in this way, the opening should be widened and the whole hand passed through it, and the testicle searched for at the entrance of the pelvis. The operator will also be aided in his operation by an assistant inserting his hand into the rectum, and so giving an idea of the relation of parts. A change in position of the animal from the recumbent to the lateral position is at times all that is necessary to bring the testicles near to the internal abdominal ring. If, with all this exertion, no testicle be found, the hand should now be passed back from the internal abdominal ring into the pelvis, between the rectum and the urinary bladder, to reach Douglas' fold. From this fold the vas deferens may be traced forwards as a fine cord about the size of a goose quill, until it terminates at the epididymis and the testicle. The testicle should then be pulled through the surgical wound to the surface and excised with the ecraseur. If there be two abdominal testicles they may be removed from the one side, but it is chiefly recommended to operate from both sides, removing the second testicle some time after the first. In some cases the attachment of the testicle is very short within the abdomen or pelvis, and cannot be drawn into the canal. It must, therefore, be taken away with the écraseur in the cavity. If a large cyst prevents the testicle from being pulled into the inguinal canal, it must first be punctured with the finger, and the testicle then drawn to the surface of the external wound and excised. The chloroform muzzle is then withdrawn from the nose of the animal. The wound is douched with carbolic lotion. If the internal wound has been a large one, the inguinal canal should be stopped with a pledget of aseptic wool. The external wound is closed by three or four interrupted sutures of silk. It is hardly possible to put in satisfactory sutures through Poupart's ligament and the internal abdominal oblique muscle closing the inguinal canal. The back and loin straps are next removed, and the patient laid on his side. The animal is kept down until the effects of the chloroform have passed off in order to prevent struggling when rising. When on his feet he is then taken to a previously prepared loose-box, the bedding in which should be quite clean, and on it sprinkled some antiseptic fluid. Only a little hay and water are allowed the animal till night, when a bran

mash may be given. During the first night the animal should be examined at intervals in case of the descent of bowel.

After-treatment.—The patient should be exercised daily for an hour, and his diet should be laxative, consisting, for the most part, if possible, of green food. On the second day the outer stitches and cotton-wool are removed and the wound daily washed out with an antiseptic solution, such as a 2 per cent. solution of creolin or 2½ per cent. carbolic lotion, until completely healed.

Unfavourable results which may occur are :—(*a*) Peritonitis, due to infection of the peritoneum during or after the operation. (*b*) Hernia of the bowel, due to the presence of a large wound and proper precautions, *e.g.*, pledget of cotton-wool being inserted, not being taken to prevent the bowel coming down. As a rule, the pressure of the abdominal contents upon the internal abdominal oblique muscle is sufficient to close the opening, but where the manipulation through the wound has been very great, the boundaries of the canal are, no doubt, weakened. (*c*) Occasionally, a scirrhous cord, as in ordinary castration. The latter should be avoided if the after-treatment of the wound has been properly carried out. (*d*) Paraphymosis ; and the sequelæ of ordinary castration.

(2) *The Danish Method.*—Here the first incision is made about 1 or 2 inches further outwards than in the Belgian method, and carried through the skin and subcutaneous tissue. Then an opening is made in the internal abdominal oblique muscle parallel to and in front of the external abdominal ring. This opening is slit like, made with a director, and in the same direction as the fibres of the muscle. The incision is made nearer to the external commissure of the ring in order to avoid the posterior abdominal vessels. It should be sufficiently large to admit the entrance of two fingers or the whole hand. Then the transversalis tendon and peritoneum are punctured with the finger, and the wound enlarged by tearing. First, two or three fingers are passed through this wound upwards and inwards for 2 or 4 inches to reach the internal abdominal ring at the side of the entrance to the pelvis and a search made for the testicles. Later the wound may be enlarged, and the whole hand, if necessary, introduced into the abdomen. Then the testicle is to be searched for as in the previous method. After the testicles are removed, the wound in the internal abdominal oblique muscle is closed by interrupted sutures. The rest of the procedure is the same as in the Belgian operation.

In the Danish method of operating there is a greater danger of hernia of the bowel through the external wound, not only during, but also after, the operation. The greater part of the operation can, however, be observed from the outside.

Clinical Articles.

TWO CASES OF DEFORMITY.

BY LIEUTENANT F. C. O'RORKE, ARMY VETERINARY CORPS, MEERUT, INDIA.

WHILST travelling in Kashmir during August and September of this year, I came across the two following unique cases, which I think are somewhat interesting.

CASE I. Near Srinagar I came across a pony, grazing in a field, which appeared to have great difficulty in moving about. On closer examination I found that both hind feet were badly deformed. The animal was walking on his coronets with the sole and frogs pointing in a backward and upward direction, and the antero-superior portion of both hoofs were worn quite flat and dragging along the ground.

History of the Case.—The owner, a native of Kashmir, informed me that previously the pony had been a very bad kicker, and that two years ago, as the animal was going down a narrow mountain path, he lashed out, striking a rock, and in some mysterious manner dislocated the corono-pedal joints of both hind legs. It was difficult to follow his description of the accident very closely, as his Hindustani was intermingled with many local Kashmiri words.

FIG. 1.—Posterior View of the Deformity.

FIG. 2.—Lateral View.

After the accident no treatment was adopted, and he said since then the pony had done nothing but graze all day. The former part of the history may be true, as the *post-mortem* examination revealed, but the latter part—about not being worked—I know was a lie, as the pony had a quite recent saddle gall on his back, and when I saw him he was at least four miles from the village where he lived.

To save any further cruelty, and thinking the case worthy of recording, I purchased the pony, which was a seven-year-old country-bred. I then shot him (and made a *post-mortem* examination), after taking several photographs, which I here produce.

Post-mortem Examination.—The lesions in both legs were almost identical. Osteophytes on the extensor pedis tendon where it passes over the second phalanx. In fact, all the structures on the articular surface of the os coronæ were embedded in a bony deposit, most probably the result of the inflammatory action set up by the pressure on these soft structures during locomotion. As I mentioned above, when either walking or standing, the whole of his weight behind was borne by the coronets.

The cartilage on the lower (inferior) extremity of the suffraginis and os coronæ of both hind limbs was ulcerated, and on the near hind suffraginis it had extended right through the articular surface of the bone.

The anterior and lateral surfaces of the coronæ were covered with exostoses, and the lateral ligaments of the first interphalangeal joint were becoming ossified.

The inferior borders of both pedal bones were in a condition of rarefying ostitis, and from the relative portions of the os coronæ and os pedis it was evident that the dislocation was of old standing.

Case 2.—On September 7, when out shooting by moonlight, we killed a brown she bear. When the coolies lifted it on to a ladder, to carry it back to camp, we saw that she had no foot on the near hind leg, but only a stump hanging down.

Next morning I made a careful examination of the distal extremity of the limb and found a faint cicatrix ¾ inch in length, but the hair was growing quite thick all over the stump.

Although, after separating the hair, I saw this faint scar, I was still undecided whether the deformity was congenital or the result of an accident. The cicatrix being so small, I thought that possibly it might be the result of an injury received whilst climbing up the mountains over sharp rocks, stones, &c.

On dissecting the legs I found the distal extremity of the tibia and fibula intact, also that the astragalus was uninjured, but the calcis was fractured and only the posterior portion of it remaining. Its anterior portion and the remainder of the foot were missing.

It was marvellous to see the neat way in which Nature, without the aid of human hands or antiseptics, had healed up what at one time must have been a bad wound.

It is difficult to say how the poor beast lost her foot; most probably in a native trap or by a bullet.

TWO POST MORTEMS.

BY A. C. DUNCAN, M.R.C.V.S., PROFESSOR IN THE ROYAL AGRICULTURAL COLLEGE, CIRENCESTER.

Ruptured Heart in a Ewe.

On June 6 last, during the course of a shearing competition at the Royal Agricultural College, an Oxford ewe, four and a half years old, and in good condition, was shorn by one of the students. On rising from the ground, the ewe walked across the field and lay down. The shepherd following, she rose, but almost immediately lay down again.

I had previously watched the shearing of this animal, which was very carefully done, the shearer, in fact, being the winner in the competition.

On being sent for, I noticed that the ewe was becoming visibly weaker, being unable to stand, and very soon she died.

The *post-mortem* examination revealed in the abdomen a little blood-stained peritoneal fluid, in the thorax the pericardium was distended with blood, and on exposing the heart a rent about 1 inch in length was found in the heart wall. The site of the rupture was the left auricle near to junction with the ventricle.

On cutting and examining sections of the heart muscle it proved to be "fatty."

Navel Infection in a Lamb.

The subject of this case was a black-faced ram lamb, four months old, the property of a farmer.

The lamb was sent to me for *post-mortem* examination on July 18, with the following history: On the previous Sunday (15), the lamb was noticed to be swollen under the belly. The shepherd dressed it with ammonia liniment, and on Tuesday the animal died.

On opening the abdomen, the end of the cæcum was found to be twisted on its own axis, and round a loop formed by the adhesion of the fundus of the urinary bladder to the body wall at the umbilicus. The bowel was, as might be expected, much congested, and the fundus of the bladder, at the point of union with the body wall, was gangrenous.

This would seem to be a sequel to septic infection of the navel, the urachus being principally affected in this case.

SEA WATER AS A CAUSE OF ECZEMA IN THE DOG.

BY COLONEL JOSHUA A. NUNN, PRINCIPAL VETERINARY OFFICER TO THE ARMY IN INDIA.

During a recent voyage from Durban to Bombay, my attention was called to a terrier dog, the property of the captain of the ship, that was suffering badly from eczema. The owner said that the dog had got the "mange," and that he had been told that there was no cure for it like plenty of sea water. This he had applied three or four times a day by putting the dog under the ship's hose, but without effect, and, in fact, the animal had been getting worse.

I recommended that the dog should be only washed once a day in *fresh* water with glycerine soap, of which there was a plentiful supply on board.

Unfortunately, about ten days after, in a heavy gale, the dog was washed overboard, but even in that short space of time there was a most marked improvement, although absolutely nothing had been done beyond substituting fresh water for salt.

This case seems to me to be somewhat peculiar. I have known dogs to be in the habit of remaining many hours in the sea, and to be constantly wet with salt water, and although I have seen cases of canker in the ear that I have attributed to this cause, I have never before come across one of eczema.

THE CURIOUS FOREIGN BODIES SWALLOWED BY CATTLE.

BY JAMES G. TAIT, M.R.C.V.S., FORRES, N.B.

CASE I.—I was called to a farm some nine miles away from here to see a cow which was said to be choked. I found that the animal had been vomiting, and that the front part of the stall was covered with saliva, whilst the animal herself was showing a most peculiar jerky movement of the head.

She had been tympanitic, but that had disappeared before I got there.

I attempted to pass the probang, but was unable to do so on account of an obstruction about two-thirds down the gullet. I came

FIG. 1.—The Iron Heel of a Labourer's Boot (Actual Size).

to the conclusion that there was no turnip, but was unable exactly to state what the foreign body could be. I administered a dose of linseed oil, and arranged with the owner that I should come back the next day to operate.

To my surprise, on the following morning I received a telegram to say the cow was all right, but on the second day afterwards I got a second wire urging me to come at once prepared to operate. On arrival, I again passed the probang and readily found the peculiar obstruction,

but was still unable to exactly identify its character. The patient was cast and secured, and upon cutting into the œsophagus, at a position about 5 inches in front of the chest, I found the iron heel of a

Fig 1.—Hasp or Catch of a Door (Actual Size).

labourer's large, heavy boot, with the five nails jagged and projecting for fully ½ an inch, and each one penetrating the œsophagus.

I removed each of them separately and very carefully, dressed

the wounds with antiseptics, and sutured the œsophagus and skin separately.

I kept her on soft food and visited her again three days later. On this occasion there was a large swelling all round the wound, and upon opening it I found the contents to consist of long grass which the animal had eaten before choking, and which had been returned from the rumen during the process of rumination.

I removed all food from the pouch, cleansed it with antiseptics, and again stitched it up, giving strict instructions that she was only to receive sloppy food. A week later I allowed her to have a little chopped grass.

The case was of particular interest to me on account of the large size of the piece of iron and the distance it had travelled downwards, especially considering the resistance the jagged and projecting nails must have afforded. Recovery was uninterrupted.

The photograph shows the ground side of the heel, and on the opposite side there are the jagged nails.

In CASE 2 the foreign body was the hasp or catch of a door, and I removed it from the stomach of a cow by rumenotomy, the patient making an excellent recovery afterwards. The animal showed the usual symptoms of indigestion, and the presence of a foreign body was suspected, although of course the actual thing was not diagnosed until the rumen was opened.

A CANINE IDIOSYNCRASY: EXCISION OF THE ANAL GLANDS.

BY HENRY TAYLOR, F.R.C.V.S., HAYWARD'S HEATH, SUSSEX.

THE subject of the above was a pure bred, red-brown, Samoyede dog. He was four years old, and had been in the owner's possession since he was quite a puppy. The breed is of the long-haired type, and I was asked to examine him to see if anything could be done to cure him of a curious and extraordinary habit, very distressing to his owner, which resulted in the loss of the hair over the hindquarters in such quantity as to disfigure himself.

Without any warning and without any very apparent cause, he would behave in the following extraordinary manner: First he would commence by whirling round in a circle, barking, and endeavouring to bite at something in the region of his hindquarters. Then, after some seconds of this business, he would drop his hindquarters on the ground, still propping himself on his forelegs, and bite away at the region of his thigh and tail, and pull out the hair in mouthfuls. This was done in a frenzied manner, as if some very violent irritation existed in that region.

To vary the performance, he sometimes used to get hold of a leg in the region of the tarsus, meanwhile growling in an apparently fierce manner. He did not lacerate, or even puncture, either this part or his hindquarters in the performance. Sometimes, also, the paw seemed to be the offending member, and was similarly served. During these

paroxysms not only did he pull out his own hair, but he also used to pull up the turf on the lawns and spoil their appearance; finally, he was not allowed on them, he got so bad.

As a result of the above behaviour, the dog made himself a curious object, having hair five or six inches long covering the fore part of the body, whilst that of the femoral and tibial regions, and that covering the tail, was only about half an inch long.

He was kept in a small yard in the garden, and his owner states that during the night time she sometimes heard noises which she felt sure signified an attack. I must mention another idiosyncrasy in connection with the animal. If given a bed of straw to sleep upon, he used to soil it, and then make himself in such a mess; but if allowed to lie on bare boards he kept himself clean. In disposition he was rather excitable. There was no history of worms.

On examining him to find the cause of the trouble, I looked first of all for any skin irritation, but there were none of the usual signs of that affection. The skin was clean, not, apparently, hypersensitive, and of a normal appearance. There was no eczema, and not the slightest trace of a flea. But on examining the anal region I found the anal glands enlarged, and containing a quantity of dark brown semi-fluid matter, which I evacuated. This, I suspected, must be the cause of the trouble. The treatment adopted was the frequent evacuating of the glands and the insertion of some suppositories containing a little opium, plus powdered galls. For a time this appeared to be successful, then the attacks at length came on again. Next I injected each anal gland with 5 minims tincture of iodine, again with apparent benefit. Subsequently, the attacks recurred, so, as a final attempt, it was decided to remove the glands. The dog was brought to my place, and, after being prepared, was operated on, under chloroform. He was very excited and violent going under. The operation was performed as follows:—The anal orifice was dilated, and a fine probe passed into the duct, which lies just inside the opening of the anus, and as far down into the pouch as possible. An incision was then made through the skin, about three-quarters of an an inch from the centre of the anal orifice, immediately overlying the point of the probe. A pair of forceps were then passed through the incision, and the pouch, still containing the probe, grasped by them. The pouch was dissected around, and the probe withdrawn, the final attachments severed, and the pouch withdrawn through the incision by means of the forceps. On one side there was a little hæmorrhage, due to one of the small hæmorrhoidal veins being cut. The usual antiseptic precautions were, of course, observed. Subsequent treatment consisted of syringing out the operation wound and plugging them with pledgets of cotton wool. Healing was uneventful, and the process was practically completed in four or five days.

After that, as he did not attempt to run away, he was allowed to run about our garden and on the lawn, my man having strict injunctions to watch him for any recurrence of the strange behaviour. This continued for a week without the slightest suspicion of any return, or, in fact, any irritation in the anal region. Then he went home. A few days after I received word that he was as bad as ever. He was consequently destroyed shortly after, and, unfortunately, no *post mortem* was made.

Now the cause of this most curious behaviour is rather obscure. After the operation it is highly improbable it was due to any local irritation in the anal region. I am inclined to think that the manifestations were referable to a nervous origin, though in what precise manner it is impossible to say. Perhaps under certain conditions the skin of the region became extremely hyperæsthetic and irritable.

The animal was very much in-bred, which is an interesting fact from a psychological point of view. His pedigree is given as follows:—His sire was Himar, who was the offspring of Musti and Neva; his dam was Neva, who was the offspring of Musti and Whitey.

From that it appears that his dam and his granddam are the same animal Neva, whilst his paternal and maternal grandsires are both Musti.

The Samoyede dogs are rare in this country; the typical colour is white. Their natural habitation is the vast Tundra country which stretches along the shores of the Arctic Ocean, from the White Sea to the Yenesei River. In all the recent Arctic Expeditions, including Nansen's, the Samoyede dogs were used as sledge dogs. One of the admirers of the breed recently stated in an article describing them that "they do not appear to be subject to distemper."

I have seen only one other dog which showed symptoms at all comparable to the above. This was a rough-haired terrier, which used to behave in a very similar manner *directly one squeezed his tail.*

Thinking, perhaps, that when he was docked a nerve filament had been implicated in the cicatrix, I amputated another caudal segment, but the dog was afterwards as bad as ever. To the best of my recollection we tried this case with a course of bromide with a like negative result.

A CASE OF MALIGNANT ŒDEMA.

BY LIEUTENANT B. LANE, ARMY VETERINARY CORPS, WOOLWICH.

On the 16th of April one of the troop horses fell, and sustained a contusion of the breast and lower part of the neck.

April 17.—The animal was reported as being dull and off his feed, and on examination it was noticed that there was some considerable inflammatory swelling and soreness of the bruised parts. The patient was put on sick diet and fomentations ordered.

April 18.—Horse was dull and restless; had eaten nothing, and seemed to experience considerable pain on drinking. The temperature was 102·8° F., pulse frequent and hard, and respirations accelerated.

April 19.—Temperature 103·2, membranes injected, bowels constipated, no inclination to eat, and movement attended with pain. The bruised region was invaded by a hot and painful œdematous swelling, and no external wound was at any time discoverable.

Treatment.—Fomentations, followed by application of belladonna and glycerine, repeated enemata, salines and careful nursing.

April 20.—Symptoms unchanged.

April 21.—Temperature 103° F.; general symptoms unchanged,

with the exception that the swellings showed a tendency to extend and to crepitation.

Treatment.—Diuretics and quinine, with continued careful nursing. The swellings were tapped, resulting in escape of offensive gas and a putrefied clear fluid. A microscopic examination of the fluid showed mixed infection, with a marked preponderance of bacilli, single and in filaments.

April 23.—Death took place between 1 and 2 a.m., the animal having become progressively worse during the previous twenty-four hours.

Post mortem.—The tissues around the bruised region were partially emphysematous and putrid, and there was a quantity of blood-stained œdematous fluid. The skin over the parts injured was more or less separated from the underlying parts, and showed signs of mortification. The muscles of the lower part of the neck and breast were markedly crepitant and of a yellowish-green tint. The connective tissue for a considerable distance from the actual seat of injury was infiltrated with a deep yellowish serosity. At the base of the neck on left side was a decomposing blood clot. The blood was dark, and showed a disinclination to clot. Heart was enlarged, engorged and covered with ecchymoses; lungs congested.

Smears of blood from the vessels in the locality of bruised region were examined microscopically and found to contain numerous filaments of malignant œdema bacilli.

Cultivations on agar and blood serum were made from exudation and blood. The former produced numerous colonies of pyogenic organisms. The latter was negative, owing to the fact that they were made under aerobic conditions.

AN INTERESTING CASE OF OVARO-HYSTERECTOMY OF THE PREGNANT UTERUS IN A BITCH.

BY FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E., KENSINGTON, W.

THE patient, a bull bitch, a primipara, aged 2, was due to whelp, and commenced to show signs of approaching labour one Monday evening. Between then and Thursday she was delivered, with assistance, of three puppies, but it was very evident that there were several more to come. On Thursday evening, between midnight and four o'clock, two more were taken away with instruments; one still remained, and from the fœtor of the uterine discharge and the palpable emphysema, which could be felt through the abdominal wall, it was evident that no time was to be lost if the bitch's life was to be saved. Under chloroform, using a kitchen table as the operating table, and securing the animal with hobbles, laparotomy was performed with the usual strict attention to antiseptic details, and a puppy, swollen to an enormous size, was found at the top of the left horn of the uterus.

Ligaturing above each ovary and close to the mouth of the uterus, this latter organ, together with its contents, was completely excised. The muscle wound was sutured with silk and the skin with silk-worm gut, the whole being covered with iodoform-colloid. She was fed

cautiously for the next ten days and made an absolutely uninterrupted recovery. Her only cause for complaint during the three or four days subsequent to the operation seemed to be that she could not find any puppies to nurse, the latter being all dead. The case is of particular interest because of the perceptible putrefaction which had commenced before the operation was performed, and the entire absence of all complications.

PUS IN THE UTERUS; OVARO-HYSTERECTOMY AND RECOVERY.

BY FREDERICK HOBDAY, F.R.C.V.S., F.R.S.E., KENSINGTON, W.

THE presence of pus in the uterus of the bitch and cat is not uncommon, and although medicinal measures may be temporarily attended with success, there is no doubt that this is one of the diseases which eventually must be allotted to the care and skill of the surgeon. It is usually met with in bitches or cats which have had one or more litters and not been allowed to be bred from again, although this rule is by no means constant, and one may meet with it in the maiden bitch. The first symptoms shown are that the animal is a little dull and out of sorts at times, and that she is more easily tired at exercise; also that (it may be noticed for the first time at the œstral period) there is a drab-coloured discharge on the lips of the vulva, and that this leaves an offensive patch on the carpet or rug whenever she lies down. It is usually at this stage that professional aid is sought, and in some cases a course of tonic medicine, accompanied by careful cleansing of the vagina with antiseptics, will give temporary relief. In regard to the latter, an effort should be made by continuous syringing with warm boric acid solution to open the mouth of the uterus, and occasionally this can be accomplished to a sufficient extent to introduce a fair-sized catheter, and even to wash out some portion of the interior, but it seems an impossibility in the bitch and cat, on account of the shape and position of the two cornea to ever be quite certain which horn the catheter has entered, and even if it is made to pass into one or the other, to enable it to reach the extremity and cleanse the diseased mucous membrane.

Certainly, in one or two patients a favourable result has followed the use of the Extract of Hydrastis Canadensis, and the use of the same preparation as a lotion for vaginal douching.

One patient, an aged deerhound, has been treated in this way by Mr. Abell, M.R.C.V.S., of Derby, and myself for the past two years with marked improvement, but, of course, never to effect a perfect cure, as it is quite impossible to get direct contact with all the diseased mucous lining. She was, apparently, a case necessitating urgent surgical interference when first seen, about two years ago, but by the owner's urgent desire medicinal aid was first tried, and after a few injections and doses internally of the Hydrastis, the bitch's general health improved and the discharge ceased, returning again, however, from time to time. Surgical measures, if the patient is sufficiently strong to stand the operation, generally effect a perfect cure, and it is astonish-

ing how quickly the general health will recover and the patient put on flesh after the pus-containing organ has been excised.

The following is quite a typical instance selected out of a large number of cases of this kind :—

The patient, a bull bitch, seven years old, had had one litter of puppies when two years of age, but had not been allowed to be bred from since. She had appeared in good health until about three months before being brought for examination, and after her usual period of œstrum, the owner observed that she had a quantity of dirty, drab-coloured discharge from the vagina, this, although not smelling offensively, leaving objectionable stains on the rugs, carpets and chairs, or wherever the animal chose to lie down. Medicinal measures were tried without perceptible improvement for about three weeks, and at the end of this time the owner consented to ovaro-hysterectomy. This was done under chloroform and with strict attention to antiseptic details, ligatures of boiled silk being placed above each ovary and around the body of the uterus near the os, the whole of the organ between these being excised and removed. The abdominal muscles were sutured with silk and the skin with silk-worm gut, the former being rather a coarse variety and giving a little trouble for about a fortnight, when the skin wound (which had healed almost throughont its entire length, had to be opened up again and the internal silk sutures removed. The patient, after this, made an uneventful recovery.

INVAGINATION OF THE CÆCUM IN A PONY.

BY R. WAGHORNE, V.S., EDENBRIDGE.

THE patient, a small Shetland pony mare, aged 13, was first taken ill on July 25, apparently as the result of exposure to the sun, for all the symptoms were those of heat apoplexy. She was treated for this with ice packs, &c., and recovered from all urgent symptoms, but never seemed quite the same afterwards, and I was called to attend her again on August 23. After this she occasionally suffered from attacks of diarrhœa and colic. On September 10, about five o'clock, she was taken with acute griping pains, which apparently subsided after two doses of medicine, and I left her looking tolerably comfortable about 7.30 p.m. On the following morning about five o'clock she was again taken with violent colic, which lasted, off and on, in spite of all remedial measures, until death, which took place about 6.30 p.m. I made a *post-mortem* examination and found that the cæcum was inverted about 12 or 14 inches into the colon, the appearance being very much like that in the photograph depicted in Mr. Elphick's article in the VETERINARY JOURNAL for November.

A VAGINAL TUMOUR IN A COW.

BY R. WAGHORNE, V.S., EDENBRIDGE.

ONE day in September last I was called to a farm to see a cow in difficult labour. Upon manual examination I discovered a large fleshy tumour, which was so fixed in the vaginal passage that the fœtus could not pass it. The calf's head and feet were in the passage, and upon

pushing them back I was able to so manipulate the growth out of the way that a fine bull calf was extracted without much difficulty. On the following day I made a more complete examination and discovered, after extracting the placenta, that the growth was firmly attached to the mouth of the womb, just a little to the left side. The cow strained a good deal during the next few days, and a week later I decided to operate. With the aid of an ecraseur I removed a tumour weighing four pounds five ounces, and the case has since presented no complications, nor indeed anything worthy of comment. The vagina was treated with antiseptic irrigations, and the wound in the mucous surface speedily healed.

OBSTRUCTION OF THE BOWELS, AND DEATH, DUE TO A SPONGE.

BY HENRY B. EVE, M.R.C.V.S., FOLKESTONE.

Subject.—An aged chestnut mare used for van work, a gross feeder.

History.—The owner informed me that the mare had been at work all day, had come in and fed as usual with the others at night, and had afterwards been found suffering from colic in the early morning by the stableman. This man had administered two patent medicine colic draughts, which had not relieved her.

Symptoms.—The animal appeared restless, dull, and dejected; there was a certain amount of tympany, and tremors of the superficial muscles of the neck and left shoulder were perceptible. The body was covered with patchy sweats, and the mare had colicky pains of a more or less violent character. Pawing with the fore-feet, especially the near one, was a prominent symptom; also there was occasional grinding of the teeth, and discharge of saliva from the mouth, eructation of gas, accompanied by attempts at vomition, and discharge of spume from nostrils. The pulse was slow, and the respiration accelerated, but temperature normal.

Diagnosis.—Engorgement of the stomach with gastric tympany.

Prognosis.—Guarded; I feared rupture of the stomach might take place.

Treatment.—Hypodermic injection of physostigmine and pilocarpine. 9 a.m., the stomach was well massaged by an application of mustard, and I afterwards applied hot turpentine stoups; oleaginous clysters were given with the aid of Colonel Smith's enema tube. I administered sodæ hypo-sulph. and spts. ammon. aromat. in the form of draughts every four hours to remove the flatulence, which was soon overcome. 6 p.m.: As there had been no action of the bowels, I repeated the eserine and pilocarpine. 9 p.m.: There was still no action of the bowels, so I gave a dose of strychnine hypodermically. 12 p.m.: The bowels had acted six times, the pain ceased. Further treatment consisted of stomachics and tonics and suitable diets, and the mare was convalescent in nine days, and went to work again. After working for a week she had another attack, and this time the symptoms were similar, but far less pain and paralysis of the intestines was present. Moreover, the eserine and strychnine had little or no effect, and as

the mare was gradually becoming emaciated I advised the owner to have her destroyed. The result of the *post-mortem* examination was interesting. The stomach was healthy in appearance. The intestines were congested, especially the small one, and in the ileum at its terminal portion I discovered a small piece of sponge firmly wedged in, and which had evidently been swallowed some time before. This had caused an intussusception and obstruction of the bowel.

It has been brought to notice that horses are frequently brought forward for casting on account of debility without any evidence being produced to show that veterinary efforts have been made to restore them to health. The commander-in-chief therefore desires that no horse should ever be cast on this account unless the veterinary officer under whose care the horse has been, certifies that nothing further can be done to make the animal serviceable.—*Pioneer*, Allahabad.

THE ANIMAL DISEASES ACT OF 1906 (CAPE COLONY).

The following Amendment to the Animal Diseases Act was passed by the last Session of Parliament, and will be brought into operation on January 1, 1907 :—

Act to Amend and Extend the Provisions of Act No 27, of 1893, entitled the "Animal Diseases Act, 1893."

Be it enacted by the Governor of the Cape of Good Hope, with the advice and consent of the Legislative Council and House of Assembly thereof, as follows :—

(1) The "Animal Diseases Act, 1893," shall be read and construed as if the provisions of the third, fourth, fifth, sixth, seventh, eleventh, twelfth, and thirteenth sections thereof, regarding the importation, quarantine and removal of animals, applied *mutatis mutandis* to articles or things which either by contact with such animals or through any other means, are or have been rendered capable of carrying the infection or contagion of disease amongst animals.

(2) Notwithstanding anything to the contrary contained in Part II. of the said Act, it shall be lawful for the Minister, in the event of any animal being found affected with the disease of Lung-sickness, the diseases of Glanders and Farcy, or the disease of tuberculosis, to perform any of the following acts, that is to say :—

(*a*) In case of Lung sickness :—

(1) To cause the immediate destruction of the animal or animals found infected by the Board convened under Section IX. of the said Act, compensation being payable to the owner of an amount equal to one-half of the value of the animal before infection, such compensation to be assessed by the said Board, and in no case to exceed £40 sterling for any one animal.

(2) To cause all animals which have been in contact with infected animals and are liable to be infected to be inoculated or drenched under the supervision of a Government Veterinary Surgeon or other Officer thereto specially authorised in writing by the Minister, or other competent person authorised by the Board constituted under Section IX. of the said Act, and to be isolated under quarantine.

(*b*) In the case of Glanders or Farcy:—

(1) To cause the immediate destruction of the animal or animals found by the Board convened under Section IX. of the said Act to be visibly infected, compensation being payable to the owner of an amount not exceeding one-third of the value of the animal before infection, such compensation to be assessed by the said Board, and in no case to exceed £25 sterling for any one animal.

(2) To cause all animals which have been in contact with infected animals, and are liable to be infected, to be tested with Mallein by or under the supervision of a Government Veterinary Surgeon or other Officer thereto specially authorised in writing by the Minister, and to be isolated under quarantine.

(3) Any of the incontact animals that react to the Mallein test must be isolated under quarantine and destroyed on developing the disease in visible form.

(*c*) In the case of Tuberculosis:—

(1) To cause the immediate destruction or permanent isolation under quarantine of the animal or animals found by the Board convened under Section IX. of said Act to be visibly infected, compensation being payable to the owner for animals so destroyed of an amount not exceeding one-fourth of the value of the animal before infection, such compensation to be assessed by the said Board, and in no case to exceed £15 sterling for any one animal.

(2) To cause all animals which have been in contact with infected animals, and are liable to be infected, to be tested with *tuberculin* by or under the supervision of a Government Veterinary Surgeon or other Officer thereto specially authorised in writing by the Minister, and to be isolated under quarantine.

Animals slaughtered under the provisions of this section shall be buried by or at the expense of the owner, and if not buried by the owner the expenses of the burial shall be recoverable from such owner in any Court having jurisdiction.

(3) The election section of Act No. 27 of 1893 is hereby repealed and the following provisions substituted in lieu thereof:—

Whenever it shall be proved to the satisfaction of any Resident Magistrate or any Government Veterinary Surgeon that any animal within the district is affected with any infectious disease, it shall be lawful for such Magistrate or any Government Veterinary Surgeon or other Officer thereto specially authorised in writing by the Minister upon notice to the occupier of the land on which such animal is, to declare such land or any portion thereof an infected area, and to prohibit the removal of any such animal as may be named in such notice from the land so declared an infected area for such period to be prescribed by the Minister as will enable the Governor, if he thinks fit,

to issue the proclamation referred to in the next succeeding section, and such notice shall be published in some newspaper circulating in the district, and a copy thereof shall be posted at the Office of the Resident Magistrate, and from and after such notice and prohibition and during such period, the owner of any animal in such infected area who shall allow any such animal to stray or be removed into any uninfected area, shall be guilty of an offence against the provisions of this Act and liable to the penalties prescribed for the contravention of the same.

(4) It shall be lawful for the Governor, whenever he shall be satisfied that it is expedient to do so in order to prevent the spread of any infectious or contagious disease amongst animals, to make, by Proclamation to be published in the *Gazette*, rules and regulations for all or any of the following purposes, that is to say :—

(*a*) To prohibit or regulate the movement of persons and the removal of any article or thing whatsoever into the Colony from any place beyond the Colony, in respect of which there shall have been issued any Proclamation under the provisions of Section V. of Act No. 27 of 1893.

(*b*) To prohibit or regulate the movement of persons and the removal of any article or thing from any area within the Colony, proclaimed as infected with any contagious or infectious disease, or from place to place within such area.

(*c*) For the removal, isolation, quarantine or treatment, whether by inoculation or otherwise, of any animal within the Colony, and for the disposal of any article or thing which there shall be reasonable grounds for believing capable of conveying any contagious or infectious disease.

Provided that in the case of lung-sickness, glanders and tuberculosis, no restriction shall be placed on the movement of persons.

And the Governor may, by Proclamation, provide for penalties for the contravention of any Regulation made under the provisions of this Act, which shall not exceed £25 sterling for any one penalty, or in default of payment of such penalty to imprisonment, with or without hard labour, for a period not exceeding three months, and any person contravening any such Regulation shall be liable to a penalty not exceeding £25 sterling, or, in default of payment, to imprisonment with or without hard labour for a period not exceeding three months.

(5) It shall be lawful for the Minister or any Officer thereto duly authorised by him in writing to enter at all reasonable times any land or premises for the purpose of carrying out all or any of the provisions of this Act.

(6) It shall be lawful for the Minister or Officer thereto duly authorised by him in writing to enter upon land being private property, being a suitable place pointed out to such officer by the owner or occupier, and to take temporary possession of such land for the purpose of quarantining animals under the provisions of this Act, and stamping out any contagious or infectious disease; and, for such temporary occupation and for any loss or damage resulting therefrom, there shall be paid to the proprietor such compensation as shall be mutually agreed upon, or, failing such agreement, as shall be determined by arbitration in accordance with the " Lands and Arbitrations Clauses Act, 1882."

(7) The term " animal " shall, for purposes of this Act and Act

No. 27 of 1893, include such animals as are from time to time proclaimed to be animals for the purpose of the said Acts.

(8) This Act may be cited for all purposes as "The Animal Diseases Amendment Act, 1906," and shall be read as one with the "Animal Diseases Act, 1893."

MARAGLIANO'S METHOD OF PRODUCING A SPECIFIC SERUM FOR THE TREATMENT OF TUBERCULOSIS AND OF VACCINATING AGAINST TUBERCULOSIS; WITH OBSERVATIONS UPON THE TREATMENT CARRIED OUT WITH THE SERUM IN PROFESSOR MARAGLIANO'S CLINIC; ALSO A REPORT ON MARMOREK'S SERUM WORK.

BY DR. M. P. RAVENEL.*

THE writer was appointed by Dr. Flick (Director of the Institute) to investigate Professor Maragliano's serum and study his methods. He went to Genoa, and spent six weeks in Professor Maragliano's laboratory and clinic. He then visited other parts of Europe, and six weeks subsequently returned to Genoa for the purpose of examining the patients who had been under treatment with the serum during his stay there. This gave practically three months for observation of the therapeutic effects of the serum. Every facility for observation and study was given by Professor Maragliano and his assistants. The writer desires here to record his appreciation of the many courtesies shown by Professor Maragliano and his associates, and to express admiration of the open way in which everything is carried on, there being no concealment of any kind in the institution of which Professor Maragliano is the founder and head.

History of Serumtherapy.—Before going into details of Professor Maragliano's methods, it may be of interest to review briefly the work of other experimenters who have attempted to discover a specific therapy for tuberculosis.

The first attempts in this direction seem to have been the outcome of the studies of Pasteur, who pointed out the antagonism which apparently existed between certain species of bacteria when cultivated together. Acting upon this principle in 1886, Cantani employed inhalations of cultures of the so-called "*Bacterium termo*" in treatment of tuberculosis, believing that it would combat the growth of the tubercle bacillus in the body, as it destroyed it in culture. Further researches showed that the supposed species "*B. termo*" really consisted of a number of putrefactive bacteria.

Better known is the attempt of Petruschky, based on the same idea, to cure lupus by injections of streptococci. It is now known that the streptococcus is one of the most common, as well as the most injurious, of the secondary or mixed infections in tuberculosis, and that only harm could have come from such a practice. The same may be said of the experiments attributed to Portucalis, who

* Abstract from the Second Annual Report of the Henry Phipps Institute for the Study, Treatment, and Prevention of Tuberculosis.

advocated the inoculation of tuberculous persons with syphilis, believing that the two diseases were antagonistic to each other.

The serum treatment of tuberculosis had its origin in the hæmotherapy of Héricourt and Richet in 1889. These authors found that the intraperitoneal infusion of normal dog's blood conferred a certain immunity on rabbits against a septic organism discovered by them—the *Staphylococcus pyosepticus*. When the blood of a normal dog was injected after infection with the *S. pyosepticus*, 75 per cent. of the dogs were saved; when, however, the blood of a dog which had recovered from infection with the *S. pyosepticus* was used, all the rabbits were saved. Encouraged by these results, and reasoning that the supposed immunity of dogs against tuberculosis implied some protective power in their blood, Héricourt and Richet carried out an extensive series of experiments, injecting the blood of dogs into the peritoneal cavity of rabbits infected with the avian tubercle bacillus. Their results showed that while 55 per cent. of the rabbits not receiving the dog's blood died, only 17 per cent. died after such treatment. They conclude that (1) in virulent infections the injection of the blood retards, but does not arrest, the evolution of tuberculosis; (2) in moderately virulent infections the injection of blood arrests the disease; (3) the blood of tuberculous dogs has more protective power than that of healthy animals; (4) too large doses of blood of tuberculous dogs hasten the march of tuberculosis.

After two years of experiment, in 1891 Héricourt, Langlois, and St. Hilaire began the use of dog's blood for the treatment of human tuberculosis in one of the Paris hospitals, with apparently good results. Feulard reported undoubted amelioration of the local lesions in lupus; while Pinard and Landouzy obtained equally striking results in young babies of tuberculous mothers, who showed congenital debility. In the treatment of these cases, however, Landouzy found that an artificial serum produced equally good effects, showing that there was nothing specific in the dog's blood.

Prior to this, in 1890, Bertin and Picq, believing that goats were immune to tuberculosis, had experimented by transfusion of their blood into rabbits, and believed that they produced in this manner a "bactericidal" condition of the blood against the tubercle bacillus. This was observed only when the transfusion and inoculation were made simultaneously; when the transfusion was done later it had no effect. They employed this treatment in some ten cases of human tuberculosis of various types, with supposed good results. Following their example, Lepine and S. Bernheim employed the method with a certain amount of success, as reported.

In 1892 Bouchard repeated the experiments of Héricourt and Richet, and found that his treated animals died more quickly than the controls.

It was also demonstrated by various authors that birds, dogs and goats, all of which had been supposed to be immune to tuberculosis, were not so in fact, possessing only a relative resistance to the disease. Beginning about this time, and to a certain extent as the result of the work which had gone before, new ideas as to the immunity in tuberculosis became current, and since then all efforts have been directed towards the production of immunity after the methods of Pasteur—by attenuated cultures; or by the use of the toxins and products of the

tubercle bacillus; or by varying combinations of the two, the object being to bring about a true vaccination against the disease in some of the lower animals, with the formation of antibodies in the blood, which could then be used for the passive immunisation, as well as the treatment, of man.

Héricourt and Richet were the first to attempt this, remembering that in the case of rabbits infected with *S. pyosepticus*, they had been able to save them by injections of the serum of dogs which had recovered from the same infection.

They still preferred dogs for the production of their serum. The dogs were infected with avian or with human tubercle bacilli, but immunity does not appear to have been produced before the employment of the serum. The serum then was only that of a tuberculous dog, and was used with the idea that both toxin and antitoxin would be in the blood of such an animal.

Daremberg, working along these lines in the laboratory of Strauss, found that rabbits treated with the serum of infected dogs, and then inoculated with human tubercle bacilli, died more rapidly than the controls.

In 1893 Babes published results obtained by using the blood of dogs which had been vaccinated against tuberculosis. He found that the serum had both prophylactic and curative properties on his experimental animals. Employed in cases of human tuberculosis, he reported excellent results, especially where the disease was localised. In cavernous cases he observed marked amelioration of symptoms, with gain in weight and strength, lessening of cough, and in two cases progressive diminution, and even disappearance of bacilli from the sputum.

In 1894 von Bernheim undertook the production of a serum from goats, horses, asses, and small laboratory animals. His material for injection was the fluid culture medium on which tubercle bacilli had been grown, passed through a Kitasato filter. The treatment was kept up for half a year. Bernheim considered the serum bactericidal, prophylactic and curative. He employed it in upward of 300 cases of consumption, and claimed a good proportion of successful results in patients in the first and second stages of the disease.

In 1895 Redon and Chenot produced a serum in asses and mules by the subcutaneous injection of "tuberculous products," among which they mention (1) emulsions of cultures of tubercle bacillus, ten, six, and three months old; (2) emulsions of human tuberculous products after one, two, and three passages through guinea-pigs. They also used injections of tannin mixed with their emulsions. After repeated injections the asses and mules produced a serum which had marked effect on the evolution of tuberculosis in guinea-pigs and rabbits. This action they found much more intense in the serum of animals first "tanninised," and then treated with emulsions of tuberculous products of high virulence.

In this year also Boinet, having obtained very successful results in guinea-pigs with the serum of a goat which had been immunised against tuberculosis, used the same treatment in a series of cases of human tuberculosis. Favourable results were observed in slow and apyretic types of the disease, and also in two cases which had reached the second stage, but in cases with cavities it was found useless.

About the same time Broca and Charrin tried the serum of dogs which had been rendered tuberculous by Charrin and Pottevin in cases of cutaneous tuberculosis, and concluded that it had no specific power, though in the treatment of certain cutaneous ulcerations it seemed to be an efficacious adjuvant.

In August, 1895, Maragliano announced at Bordeaux his discovery of a serum for the treatment of tuberculosis which will be described further on.

In this year also Paquin gave the results of his attempts to produce a serum against tuberculosis. He used horses for this purpose, injecting them successively with the sterilised bouillon on which tubercle bacilli had been grown, then with the bacilli killed by heat, and finally with living bacilli. He reported good results in the use of the serum. Among those who have employed it, some confirm Paquin's results, but others deny any value to the serum.

Viquerat, in 1896, attempted to immunise mules by the intravenous injection of bouillon cultures of tubercle bacillus. From these animals he obtained serum which protected guinea-pigs entirely from tuberculous infection, and gave brilliant results in the treatment of human tuberculosis, especially in cases of bone affection. During the same year, however, Rutkowski repeated the experiments of Viquerat, and reached diametrically opposite conclusions. In fact, he found that the serum was distinctly injurious, and even caused death in many of the experimental animals.

Auclair, in 1896, attempted to immunise fowls by the injection of human tubercle bacilli and the bouillion on which the cultures had been grown. The serum of fowls so treated had no appreciable protective power on guinea-pigs, and the author concluded that no antitoxic substance had been formed in the blood of the fowls in consequence of his treatment.

During this year the work of Nieman appeared. This author made use of young goats, injecting first tuberculin made from highly virulent cultures, and after a time following this treatment by injections of the alcoholic precipitate from tuberculin, both being given in ascending doses. The resulting serum made very good results in guinea-pigs, most of them surviving eighteen months, while controls died in fifteen weeks. In man, however, it failed to produce the cure of tuberculosis, though it prevented the tuberculin reaction from taking place. It was essentially an anti-tuberculin serum.

During the year 1897 we have records of many attempts to produce a specific serum against tuberculosis.

De Schweinitz reported his work in this direction, which was really a continuation of his immunisation experiments published in 1894. He attempted to immunise one cow by the repeated injection of large quantities of tuberculin; two other cows receiving increasing doses of an attenuated culture of the tubercle bacillus described in the paper mentioned (1894). Two horses were treated with injections of attenuated cultures, culture fluid and bacilli. The serum produced by De Schweinitz had marked effect on guinea-pigs. A number of physicians (Trudeau, Stubbert, Richardson) made use of it, with some encouraging results.

MacFarland, during this year, produced a serum in asses by injection of the old tuberculin, which he designated "anti-tuberculin."

It was used in the treatment of about twenty cases, some of which showed definite improvement. MacFarland concludes: "I think we have in anti-tuberculin a substance useful in the treatment of tuberculosis, in that it ameliorates certain symptoms seemingly associated with the toxic conditions present."

Fisch also produced about this time his antiphthisic serum "T.R." He began his immunisation by injections of Koch's new tuberculin "T.R.," adding later the "T.O." He considered his serum both antitoxic and bactericidal. Numerous favourable reports have been made of this serum, but it cannot be regarded as a specific.

Peron (1897) made use of pus from cold abscesses, rendered sterile by prolonged exposure to light, for the production of immunity, by intraperitoneal inoculation. He found that his method diminished only the toxic effects of the substances contained in the bacilli, and had no effect against the living germs.

Patterson, in October, 1899, reported his experiments. He immunised fowls and found that their serum had the power to render rabbits and guinea-pigs immune to mammalian tubercle bacilli. He used the serum on himself, and recommended it as a prophylactic for persons with a tuberculous history or tendency.

Maragliano's Work.—As before mentioned, Maragliano's first communication appeared in 1895, since which time he has from time to time contributed numerous articles describing his advances. His last and most complete paper was prepared for and published by the Henry Phipps Institute.

After more than fifteen years of experiment and study Maragliano announced in this paper two conclusions:—

(1) That it is possible to produce a specific therapy for tuberculosis.

(2) That it is possible to immunise the animal organism against tuberculosis as is done in other infectious diseases, and that there is good reason to hope for an antituberculous vaccination for man.

Methods.—The serum for therapeutic use is produced from horses and cows, following, in general, the methods employed in the production of other sera against infectious diseases, that is, a progressive active immunisation of the animals, during which defensive anti-bodies are produced in the blood. The methods of bringing about this immunisation, and of exactly measuring the protective power of the serum of immunised animals, constitute the pith of Maragliano's discoveries. One of the great difficulties in the way of producing an anti-tuberculous serum has always been the apparent impossibility of obtaining the sum total of the toxins formed by the tubercle bacillus. This difficulty Maragliano believes he has overcome.

The animals to be immunised receive under the skin increasing quantities of two preparations—Liquid F. and Bacillary Pulp. The former of these consists of equal parts of Maragliano's watery tuberculin and the filtrate from living and virulent tubercle bacillus cultures, obtained by passage through the Pasteur-Chamberland filter. The bacillary pulp is made up, as its name implies, of the substance of tubercle bacilli, unaltered by heat or other agents. It is obtained by grinding the bacilli with sand in water, and subsequent passage through a Pasteur-Chamberland filter. Equal quantities of these two fluids are injected at the same operation, but in different parts of the body.

If there is no marked fever and no local reaction a second injection is given after three days, the quantity being doubled. Subsequent injections are made at intervals and in quantities depending upon the animal and its reaction to the injections, both local and general, the dose, however, being progressively increased. This process is kept up until the serum of the animal is found to have a high agglutinative and protective power, as tested by Maragliano's methods, to be described later. Test bleedings may be made from time to time to determine the progress of immunisation.

Agglutination.—This is carried out after the method of Courmont and Arloing. The serum to be tested is added to a homogeneous culture of the tubercle bacillus in test-tubes in varying proportions. Twenty-four hours are allowed to elapse before a reaction is considered negative. In using this method for the estimation of the production of anti-bodies, it must be remembered that very minute doses of tuberculin will entirely prevent the reaction, consequently some days—ten to fifteen—must be allowed to elapse between the last injection and the test bleeding. This property increases step by step with the antibacterial power of the serum, not with antitoxic power.

Standardisation—The serum is standardised by means of Maragliano's test poison. This test poison is his watery tuberculin, and is made of such strength that it will kill surely in doses of 1 per cent. of the body weight. If death occurs in less than twenty-four hours, the test poison is too strong and must be diluted with normal salt solution. If the animal lives more than five days, the test poison is not strong enough and must be concentrated. Having a standardised test poison, the protective power of a serum is determined by finding out how much serum is required to protect an animal against the known fatal dose of the test-poison.

The potency of the serum is measured in terms of antitoxic units. A serum of which one gram would be required to protcct one gram of animal from the known fatal dose of test poison would be said to contain one antitoxic unit. If one gram of serum would protect one hundred grams of animal, it would then contain one hundred antitoxic units, and if one gram of serum would protect one thousand grams of animal it would contain one thousand antitoxic units. No serum is allowed to leave Maragliano's institute that does not contain at least one thousand antitoxic units per cubic centimetre. Every bleeding is tested in the above manner before being used for therapeutic purposes.

Experiments with Serum.—The serum has the power of producing passive immunity very rapidly. In one series of experiments, after five subcutaneous injections on alternate days, the blood of the rabbits injected agglutinated in the proportion of 1 to 350. An emulsion of a culture known to be virulent was then injected into the circulation through the aural vein. None of the rabbits showed any illness, and when killed were found to be free from tuberculosis. The controls showed tuberculosis of the liver and spleen. The dose given was five milligrams of partially dried culture, this having been previously determined to be the fatal dose. When inoculated into the anterior chamber of the eye, even after one or two subcutaneous injections of serum, rabbits escaped either without injury or with the development of a few isolated tubercles in the iris. In no case did general infection or panophthalmitis develop. The

controls developed panophthalmitis always. When serum and bacilli were mixed *in vitro* and injected into the anterior chamber of the eye, isolated tubercles usually developed, but without generalisation and without loss of the eye.

Therapeutic Use of the Serum.—The serum is in general use at the Ambulatory Clinic of Professor Maragliano, which is under the charge of Dr. Figari. Upwards of fifty patients were seen under treatment. Most of these were of the very poor classes, unable to supply themselves with proper nourishment, or to give themselves a proper amount of rest. The chief food of all of them was "pasta"—different forms of macaroni. A few of them took a fair quantity of milk and eggs. None of them spent more than one or two hours a day in the open air, except a few whose occupation was outdoor work, and without exception all of them slept in rooms with the windows tightly closed, the fear of night air being very prevalent all through Italy, even in the highest classes. A number of houses were visited for the purpose of inspection. They were found to be clean, but the rooms were small and the ventilation very poor. In a fair proportion the constitution was such that no sun ever reached them. In practically every case the serum was given under what might fairly be considered adverse circumstances, and the treatment consisted solely in the injections of the serum. The period during which it was possible to keep patients under observation was not long enough to form a positive opinion of the value of the serum in the treatment of tuberculosis, and judgment must be suspended until a greater number of cases has been observed, and the patients kept under observation for a longer time. In a chronic disease like tuberculosis it is especially difficult to form a correct estimate of any particular drug or method of treatment.

Review.—In view of the experiments quoted, as well as many others of like character, it appears established that Maragliano has succeeded in producing a serum which protects experimental animals against the poisons of the tubercle bacillus, so far as we have been able to obtain them, and also against the tubercle bacillus itself, in pure culture, when given in doses which do not overwhelm the animal, but which have been shown to be fatal. From the laboratory standpoint it seems that his claims cannot be successfuly contested. The curative value of his serum is not so well established. One great difficulty here, lies in the fact that the large majority of cases of tuberculosis which come under observation show the effects of mixed infection. Maragliano lays stress on this distinction between tuberculosis of the lungs and phthisis, in which he is scientifically correct. Practically, however, it is generally phthisis that we are called upon to treat. It seems reasonable to believe, nevertheless, that in cases of phthisis, if we are able to combat the tuberculous infection, we are in a better position to handle the other infections, and with one source of trouble out of the way, the person with phthisis must stand a better chance of recovery. Only a large clinical experience can prove or disprove the correctness of this view, and the practical value of Maragliano's serum in the general run of cases of tuberculosis. Certainly there is strong ground for hope.

Vaccination.—Maragliano also practises a method of vaccination or active immunisation against tuberculosis. His material consists of

one milligram of dried tubercle bacilli, heated to 150° C. in glycerine for one and a half hours. The injection is made in three points, about 1½ inches apart. Following the injection there forms an area of induration more than an inch in diameter, with a small pustule at the centre, accompanied with some fever. After all local and general symptoms have subsided a second series of inoculations is made, exactly like the first. This is not followed by symptoms, either local or general. Only two or three cases were seen, and the subject is one which will obviously require many years to form an opinion of. The absence of reaction after the second inoculations shows the establishment of some degree of tolerance apparently.

Serum of Marmorek.

In the autumn of 1903 Dr. Alexander Marmorek, at that time connected with the Pasteur Institute in Paris, announced that he had produced a serum which was vaccinal and curative. I had already, in the spring of 1903, made a trip to Paris to obtain information about Dr. Marmorek's work, but he was not at that time ready to make his findings public. Unfortunately, at the time of my visit in 1904, Dr. Marmorek was away in Austria, having been ill for some time. I was given all desired information and literature by Dr. Jacobson, who had charge of the laboratory in Dr. Marmorek's absence. Marmorek takes issue with the old views concerning tuberculin. He does not believe that it is the specific toxin of the tubercle bacillus, nor even the principal factor in the production of lesions of tuberculosis, hence any serum produced by injections of tuberculin contains anti-bodies only against tuberculin, and not against the tubercle bacillus, or the morbid changes produced by it. The explanation generally given for the tuberculin reaction he considers very faulty. Why does it produce such unequal effects in a healthy animal, one slightly diseased, and one far advanced in tuberculosis? He holds that no satisfactory explanation has been given for the inflammatory reaction around tuberculous foci caused by injections of tuberculin.

He believes the true explanations of the known phenomena following the injection of tuberculin is found in considering tuberculin as a preparatory substance, which, acting on the bacilli themselves, leads to the secretion of a toxin entirely different from tuberculin. In other words, tuberculin acts as a stimulant on the bacilli, causing them to form their specific toxin, and to the absorption of this toxin the reaction is due. It begins only after time enough has passed to allow of the formation of a sufficient quantity of toxin in the tuberculous foci.

No reaction takes place in a healthy animal because there are no tubercle bacilli to be stimulated. In a moderately diseased animal every focus is stimulated, and reaction follows. In badly diseased animals the amount of toxin freshly produced is negligible compared with what must already exist in the numerous foci of the body. It may even be questioned if the bacilli are capable of being stimulated further in such cases. This true toxin is not found in ordinary cultures, because the conditions do not approach closely enough to those found in the body, which may be considered the normal habitat of the tubercle bacillus. Marmorek holds also that this toxin is formed by very young, or what he terms "primitive," bacilli. In older cultures

tuberculin is found. His efforts were turned to the discovery of a culture medium which would approach body conditions, and at the same time keep the bacilli as long as possible in the "primitive" state, in order to increase the toxicogenic power. As in the body the tubercle bacillus is often found in the interior of the leucocytes, he conceived the idea of growing them in contact with freshly-drawn leucocytes. This was found to have no good effect. The next step was the production of a leucotoxic serum, which was obtained by injecting calves with the leucocytes of guinea-pigs. On this medium the tubercle bacillus produces more of its specific toxin, and the cultures remain free from tuberculin for a considerable time. In order to lengthen the primitive stage of life a glycerine bouillon made from liver was added, on account of a supposed immunity possessed by the liver to tuberculous invasion. The tubercle bacillus required some time to become habituated to this medium of culture, but after a time growth took place, and successive cultures increased in virulence, forming the specific toxin almost to the entire exclusion of tuberculin. The toxin produced in this manner will kill a guinea-pig of medium size in eight days, the dose being eight to ten cubic centimetres, given under the skin.

Horses are used for the production of serum, the general method followed being successive injections of the toxin described. The injections are followed by large and painful œdemas and a rise of temperature. Absorption of the tumour is slow, and it requires seven to eight months to immunise each animal.

In doses of fifteen to twenty cubic centimetres injected under the skin three days before infection the serum protects rabbits from the effects of an intravenous inoculation of tubercle bacilli.

Marmorek also gives the following experiment, which he says has been repeated many times. Rabbits of medium size are given an injection of one or two drops of a suspension of tubercle bacilli into the aural vein. Several hours after twenty cubic centimetres of the serum are given under the skin to some of these. The next day a second lot receive twenty-five cubic centimetres, and a third lot are injected on the second and third days. Some are kept as controls without serum injections. As the controls die a rabbit from each lot is killed, and they have been found always free from disease. Those not killed survive indefinitely, in perfect health.

I have not been able to observe patients treated with Marmorek's serum, so can form no judgment of its value. It has received very adverse comment from Dieulafoy, Lucas-Championniere, Hallopeau and others; while Latham in England, Richer in Canada, and Frey in Germany give favourable reports of its action.

I have been unable to learn of any other laboratories which have produced a serum against tuberculosis. Studies in the production of immunity against tuberculosis are being carried on in many places, and very successful results have been obtained in cattle. With Dr. Pearson I visited the laboratories in Berlin, where interviews were had with Professors Koch, Schutz, Ostertag, and others. In Hanover, Dammann showed us many interesting experiments. We were unfortunate in missing Professor Ribbert, of Gottingen. In Marburg, Professor von Behring received us most courteously, and gave us every opportunity of examining his immunised herds.

Maragliano's Serum Cases.

The same issue by the Henry Phipps Institute, containing Ravenel's report, also contains reports by Drs. Walsh, Stanton, and Landis on a few cases of human tuberculosis treated with Maragliano's serum and compared with results obtained in cases not so treated.

Dr. Walsh gives particulars of five cases of human tuberculosis, two of which were treated with the serum, and three treated without the serum. His conclusions are as follows:—

(1) The serum does not by itself produce a gain in weight.

(2) As far as the lung involvement is concerned, one case which had been improving already apparently improved, the other showed no improvement, consequently nothing can be drawn from it.

(3) The serum had apparently no influence on cough or expectoration, or the presence of tubercle bacilli.

(4) Pulse and temperature underwent no change; respirations in one case increased in number.

(5) The serum usually brought about an increase in the white blood corpuscles, though this increase was temporary; twice out of the three times in which the blood was counted in the female a leucocytosis was not found.

(6) The serum may have a possible influence on the production of albumen in the urine, which occurred in the male a month after injections were begun.

(7) In the female no effect on menstruation was noted.

(8) The serum produces an enlargement of the lymphatic glands nearest to the site of injection.

(9) The serum produces local inflammation and sometimes a general urticaria.

Dr. Stanton gives details of two cases treated with serum, compared with seven cases treated without serum. All the cases were under the same conditions as to diet, hygiene and medication, being side by side in the same ward. Dr. Stanton says: "From a comparison of these cases certain preliminary conclusions may be drawn:—

"(1) Gain in weight occurs as rapidly and to as great an extent in cases not treated with serum as in those treated.

"(2) Considering the stage of the disease, improvement in the pulmonary symptoms is as great in cases not treated with serum as in those treated.

"(3) No special effect of serum upon pulse and temperature could be noted.

"(4) In one advanced case with diazo reaction in the urine, the use of serum was accompanied by a rapid loss in weight.

"(5) It remains to be proved that cases treated with serum show a lessened tendency to relapse or reinfection than cases not so treated.

"(6) As far as it is possible to judge from so limited an observation, the use of Maragliano serum is not indicated in cases of moderate or advanced degree."

Dr. Landis gives details of one case in which Maragliano serum was used, and he sums up as follows:—

This case is of no value in determining the curative properties of Maragliano's serum, and is of interest principally because of the untoward effects. At the beginning of the treatment (September 21, 1904)

the patient's weight was 112 lbs., a gain of 20 lbs. since her admission; her weight on November 6, 1904, when the last injection was given, was 117½ lbs.

At the end of the year (January 1, 1905) her weight was 126 lbs. From this it will be seen that she gained before, during, and after the use of the serum, so that nothing can be claimed for it in that respect. The signs in the lungs showed no change either for better or worse. The attacks of diarrhœa took place before, during, and after the use of the serum, the latter having no influence one way or the other.

The improvement in the temperature, pulse-rate, and respirations dated from her admisssion. It is hardly likely that the few injections, accompanied as they were by so much physical discomfort, contributed in any way toward the improvement in this case.

SCAB AND ITS ERADICATION.

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THE economic importance of scab has compelled its recognition from the earliest times amongst pastoral communities, and there is little doubt that Abraham and his contemporaries discussed and advanced theories as to its cause and proposals for its cure as earnestly as the sheep-owners of the present day. Be that as it may, it is evident that the steps taken for its eradication in the days of the Patriachs did not suffice, for the disease is still with us; but that this state of affairs can be remedied has been conclusively demonstrated by the position of the Australian Colonies to-day, where the disease formerly prevailed, but from which it has now been banished.

A consideration of the steps taken for the accomplishment of this end may be instructive and may indicate to us in South Africa the lines upon which a successful campaign against scab must be conducted. In the first place, for the effective and economical treatment of any disease a full comprehension of its cause and the manner of its spread is indispensable, otherwise time and money may be needlessly wasted.

Many theories as to the cause of scab have been advanced from time to time, but any theory which does not account for the absence of scab from the Australian Colonies to-day must be set aside as inadequate and unsound.

Now the only theory which explains the present fortunate position of the Australian Colonies is the theory that the disease is caused by a parasite, and we may conclude that in Australia effective measures have been taken for its destruction. The old view that the disease is due to some change in the blood, resulting from improper dieting, cannot be entertained, as sheep are fed and treated in Australia at the present day just as they were fed and treated before scab was abolished; nor yet can we credit the theory that it may arise from overheating sheep by rapid driving and allowing them to get to water,

* A Leaflet issued by the Transvaal Department of Agriculture.

because sheep in Australia are still overdriven at times and still allowed to drink when hot, and the disease has not reappeared.

Before the discovery of the parasite by whose agency scab is produced no country was ever freed from scab, but since then what appeared to be impossible before has been successfully accomplished; more, however, than the mere discovery of the parasite was necessary to the attainment of this end. A knowledge of the life history and habits of the parasite was required, otherwise it is conceivable that measures taken for its destruction might easily fail. For instance, had it not been known that the eggs of the parasite withstand the action of chemical re-agents—which can be depended upon to destroy the mature parasite—the haphazard application of such re-agents might have gone on indefinitely without freeing the country from the disease; had we not realised that the scab parasite can live apart from its natural host for ten or twenty days, or even longer, we might have been at a loss to understand why it was that animals dipped in such a way that the destruction of every scab parasite found upon the bodies was encompassed, did not remain free from the disease when they were returned to their original pastures within that space of time; and had we not recognised that it is possible that birds may under certain circumstances become scab-distributing agents by carrying off tags of infected wool from diseased sheep and dropping them where healthy animals come in contact with them, we might have had some difficulty in accounting for the occasional appearance of the disease in previously clean flocks which had never been in contact with diseased animals.

I am now referring more particularly to the ordinary form of sheep scab, caused by the acarus scientifically known as *Psoroptes ovis*, a parasite which lives on the skin of the sheep, laying its eggs among the roots of the wool, and which derives its nutriment from the animal's body by biting it, and thereby producing that irritated condition of the skin to which we apply the term "scab." This form of scab generally makes its appearance on the withers or along the back of the sheep, and subsequently extends and affects those parts of the body covered with long wool, injuring the fleece and reducing the condition of the animal to such a degree that death frequently results from debility.

Upon an intelligent appreciation of the life history of the scab parasite the steps to be taken for its extermination must be based, otherwise they will surely fail. That the eggs are more resistant than the mature acarus, leads us to ask if there is any agent which can be economically used which will kill the eggs as well as the adult. If not, what measures can we take which will enable us to get rid both of the mature parasites and those still in the egg stage.

Such an economical agent, which will kill both eggs and parasites without injuring their host, has yet to be found; our way out of the difficulty lies in the adoption of a line of treatment by which we first kill off all the mature forms and then wait for the eggs to hatch, and destroy the newly hatched parasites before any of these reach the egg laying stage. This we can do by twice thoroughly immersing infected animals in a dip strong enough to kill mature acari, with an interval of between eight and fourteen days between the two dippings—preferably one of eleven or twelve days.

As an alternative to dipping, hand-dressing has been advised; but such a method of local application for this type of scab is not to be

recommended, as a certain number of the parasites inevitably escape, and subsequently establish fresh colonies from which the disease again extends. Yet it must not be inferred from these remarks that hand-dressing is altogether to be condemned. Hand-dressing may be carried out to advantage when cases of scab are detected amongst a flock in cold or inclement weather, when dipping is unadvisable. At such a time the affected animals should at once be isolated and hand-dressed with an ointment, consisting of 4 ozs. of oil of turpentine, 6 ozs. of flowers of sulphur, and 1 lb. of lard; or of ½ lb. of oil of tar, 1 lb. of flowers of sulphur, and 2 lbs. of lard. Occasional application of this mixture will serve to keep the disease in check until the advent of warmer weather makes dipping possible.

Although the hand-dressing of sheep suffering from the ordinary form of scab cannot be considered a satisfactory method of treatment, in dealing with the common form of goat scab, which generally appears about the face and which is the result of infection with another variety of scab acarus, known as the *Sarcoptes capreæ*, it is certainly beneficial. Mr. Davidson, Chief Scab Inspector, Cape Colony, states that hand-dressing, in conjunction with dipping, is indispensable, if severe cases of goat scab are to be treated with any hope of success. In cases of this class two dippings of the infected animals for two minutes in a strong lime and sulphur dip, at a temperature of 110° F., at twelve days' interval, must be supplemented by thorough hand-dressing with one of the ointments already mentioned, or with a mixture of lard, sulphur, and paraffin; otherwise treatment will probably fail, as the parasite of ordinary goat scab burrows in the skin and is not likely to be killed by simple immersion in a parasiticidal dip, therefore recourse must also be had to a process of saturating the skin with an oily preparation which will penetrate the tunnels made in the skin by the acari and destroy them there.

Having considered the line of treatment for scab which offers the greatest hope of success, the condition under which this treatment ought to be carried out to give the best results may now receive attention. To begin with, as we know that the scab parasite may live apart from its host for a period of twenty days or more, it is well to place the animals in a fresh enclosure and graze them on fresh pastures after each dipping in order to avoid the possibility of the animal becoming re-infected by picking up acari which have dropped from his body on the veld or in the kraals previous to treatment being begun. This is more essential after the second dipping than after the first, but if it can be done after each, it renders the possibility of re-infection still more remote. Any bush kraals in which scabby sheep have been kept should be burned and fresh kraals erected for the ultimate accommodation of the clean animals: but if kraals of a more permanent description have been used and it is necessary to return the sheep to these after being cleansed, the animals should be kept elsewhere for at least two months, and only allowed to return after the kraals have been well cleansed out and disinfected.

Dipping is best carried out in mild weather, shortly after the sheep have been shorn, say within two or three weeks. If animals are dipped then, there is less likelihood of the wool being injured and less danger of the untoward results which may follow the dipping of sheep with a heavy fleece, particularly if an arsenical dip is used and sufficient time is not allowed to enable the excess of dip to drain from the

fleece before returning them to their pasture. It is also well to bear in mind that thirsty sheep should not be immersed in a poisonous dip, as there is always some danger of the animals drinking it; neither should ewes heavy in lamb be dipped, unless special care is taken in handling them. In South Africa, where we have a comparatively mild climate, sheep may be dipped almost at any time, if care is taken to select a suitable day for dipping, but the months of May, June, July and August may be regarded as those least suitable for conducting dipping operations.

Many dips, proprietary and otherwise, have been recommended for the eradication of scab, but it is interesting to note that, excellent though many proprietary dips are, the dips which freed the Australian Colonies from scab were comparatively inexpensive and simple preparations, which can readily be made at home by any farmer who cares to take the trouble to do so. One of these was the tobacco and sulphur dip, the other the lime and sulphur dip. Both of these dips, if properly prepared and used, are most effective, and both have certain advantages and disadvantages; the lime and sulphur dip being credited by some with causing a slight amount of injury to the staple of the wool, while the tobacco and sulphur dip spoils very rapidly after it is made, discolours the wool to some extent and occasionally sickens the sheep; but, provided sheep are dipped at the proper time, *i.e.*, shortly after shearing (within two or three weeks), the injury caused to the fibre by the lime and sulphur and the slight discolouration resulting from the use of tobacco and sulphur need not be taken into account.

The New South Wales method for preparing the tobacco and sulphur dip is as follows: first, place 1 lb. of good tobacco leaf or of manufactured tobacco for every 5 gls. of dip desired in a covered boiler of cold or lukewarm water, let it stand for twenty-four hours, and the evening before dipping bring the water near the boiling point (212° F.) for an instant, then remove the fire and let it stand overnight. Secondly, thoroughly mix the sulphur (1 lb. to every 5 gls. of dip desired) with the hand in a bucket of water to the consistency of gruel. Third, when ready to dip, thoroughly strain the tobacco infusion from the leaves by pressure, mix the liquid with the sulphur gruel, add enough water to make the required amount of dip, and thoroughly stir the entire mixture.

Some may elect to use tobacco alone, without the addition of sulphur, but sulphur renders the effect of the dip more lasting and should always be added when it is necessary to return sheep to the pasture on which they were grazing before being dipped. For those who desire to use tobacco alone, a dip made up in the following manner will be found to give satisfaction: for every 100 gls. of dip, take 21 lbs. of good prepared tobacco leaves, soak the leaves in cold or lukewarm water for twenty-four hours, then bring the water to near the boiling point for a moment, allow it to stand overnight, strain the liquid from the leaves, pressing the latter well, and then add the necessary amount of water to bring the volume of the dip up to 100 gls. for every 21 lbs. of tobacco used.

There are many formulæ for the preparation of lime and sulphur dips. I give here first the South African formula, recommended by the Agricultural Department of Cape Colony:—

Flowers of sulphur	...	...	...	25 lbs.
Unslaked lime	...	...	...	20 lbs.
Water	...	...	...	100 gallons.

and secondly, the formula used and recommended by the United States Bureau of Animal Industry :—

Flowers of sulphur	...	...	...	24 lbs.
Unslaked lime	...	...	...	8 lbs.
Water	...	...	...	100 gallons.

Both these dips are prepared in much the same manner. The Bureau of Animal Industry gives the following directions for the preparation of this dip :—

"(*a*) Take 8 to 11 lbs. of unslaked lime, place it in a mortar box or a kettle or pail of some kind, and add enough water to slake the lime and form a 'lime paste' or 'lime putty.'*

"(*b*) Sift into this lime paste three times as many pounds of flowers of sulphur as used of lime, and stir the mixture well.

"Be sure to weigh both the lime and the sulphur. Do not trust to measuring them in a bucket or to guessing at the weight.

"(*c*) Place the sulphur-lime paste in a kettle or boiler with about 25 to 30 gls. of boiling water, and boil the mixture for two hours at least, stirring the liquid and sediment. The boiling should be continued until the sulphur disappears, or almost disappears, from the surface; the solution is then of a chocolate or liver colour. The longer the solution boils, the more the sulphur is dissolved, and the less caustic the ooze becomes. Most writers advise boiling from thirty to forty minutes, but we obtain a much better ooze by boiling from two to three hours, adding water when necessary.

"(*d*) Pour the mixture and sediment into a tub or barrel placed near the dipping vat and provided with a bunghole about 4 ins. from the bottom, and allow ample time (two or three hours, or more if necessary) to settle.

"The use of some sort of settling tank provided with a bunghole is an absolute necessity, unless the boiler is so arranged that it may be used both for boiling and settling. An ordinary kerosene oil barrel will answer very well as a small settling tank. To insert a spigot about 3 to 4 ins. from the bottom is an easy matter. Draining off the liquid through a spigot has the great advantage over dipping it out, in that less commotion occurs in the liquid, which, therefore, remains freer from sediment.

"(*e*) When fully settled, draw off the clear liquid into the dipping vat and add enough warm water to make 100 gls. The sediment in the barrel may then be mixed with water and used as a disinfectant, *but under no circumstances should it be used for dipping purposes.*

"A double precaution against allowing the sediment to enter the vat is to strain the liquid through ordinary bagging as it is drawn from the barrel."

"* Many persons prefer to slake the lime to a powder, which is to be sifted and mixed with sifted sulphur. One pint of water will slake three pounds of lime if the slaking is perf rmed slowly and carefully. As a rule, however, it is necessary to use more water This method takes more time and requires more work than the one given above, and does not give any better results. If the boiled solution is allowed to settle, the ooze will be equally safe."

The most important precautions to be observed in making these lime and sulphur dips are that the solution in every case should be well boiled and that only the clear fluid, carefully drawn off without disturbing the sediment, should be used for dipping purposes. Neither the tobacco and sulphur nor the lime and sulphur dip should be prepared by guessing the weight of the ingredients employed, but everything should be carefully weighed and the water should always be measured. Both dips should be used at a temperature of from 100° to 110° F., and the animals dipped (which should include both the sheep and goats on each farm) should be kept in the dip for two minutes by the watch. The head should be immersed at least once, and dipping should be repeated after an interval of twelve days in order to destroy those parasites which were not hatched out when the first dipping took place. It should be remembered that non-observance of these precautions may defeat the purpose for which the dipping is carried out, and no greater mistake can be made than that of hurrying a flock through the dip just to save an hour or two.

While the use of dipping tanks by individual farmers will enable them to keep their sheep free from disease at a certain outlay, it must be apparent that more is required than that the enlightened members of a community shall dip their animals if a country is to be freed from scab, and to accomplish this all stock-owners should dip their animals.

Personal.

On the evening of November 28 the members of the Post-Graduate Class of the London Veterinary College entertained Sir John M'Fadyean, Dr. Lander, and Mr. Collins to dinner at the Trocadero; Major Fowler, of the Army Veterinary Corps, being in the chair. Mr. King was unavoidably prevented from being present. The Class, which this Session consisted of twenty-three members, all of whom were present, represented every department of the profession, including those engaged in the services of the Army, the Board of Agriculture, the Colonial Government and Civil practice. A very enjoyable evening was spent, and at the conclusion Mr. M. T. Collins, who has been Sir John M'Fadyean's Demonstrator for several sessions, was presented with a colonial saddle and bridle as a token of the goodwill of the members of the Class. Mr. Collins has accepted a very important position under the Colonial Government in the Fiji Islands, and left England about the second week in December. He carries with him the good wishes of his colleagues.

Mr. Walter Stapley, M.D., M.R.C.V.S., has left the service of the Veterinary Department of New Zealand, with whom he has been engaged during the past two years, and has started in medical practice at Whakataiu, in the Auckland Province of that country. Mr. Stapley, who qualified as a member of the Royal College of Veterinary Surgeons in December, 1892, was for some time engaged in country practice with the late Professor Edgar at Dartford, and afterwards went to America, where he qualified as M.D. at Baltimore a few years later.

At the last meeting of the Burma Branch of the British Medical Association the paper for discussion was on "The Milk Supply of Rangoon." The subject was introduced by Mr. A. Blake, M.R.C.V.S., the Chief Veterinary Officer to the Municipality.

The medals, awarded annually by the Royal Agricultural Society of England to the students of the London Veterinary College who obtained the highest marks in the Cattle Pathology Examinations held by the R.C.V.S., have been awarded as follows: The silver medal to Mr. A. W. Noel Pillers, and the bronze medal to Mr. A. Leslie Sheather.

Dr. H. E. Annett, whose name is now well known to the members of the veterinary profession, especially in the North of England, as one of the lecturers in the Veterinary School of the Liverpool University, has been elected to the newly-established Professorship of Comparative Pathology in that institution, and will take up the duties of the position at once. Professor Annett is a graduate in medicine of the Victoria University, and has made an especial study of the relationship between certain diseases of animals which are communicable to man.

The Veterinary Hospital of Mr. Alfred Hodgkins, M.R.C.V.S., of Hanley, was seriously damaged by fire just before Christmas, and one of the in-patients, a valuable trotting horse named "Fred Hummer,' an animal valued at £150, was burned to death.

Mr. Alexander Taylor, M.A., M.R.C.V.S., who graduated from the Royal (Dick) Veterinary College, Edinburgh, in 1905, has been appointed Lecturer in Veterinary Science to the Agricultural Department of Cambridge College, Christchurch, New Zealand. Mr. Taylor is an M.A. of Aberdeen University, and obtained his Veterinary Diploma after the Degree in Arts; after qualifying he settled down to private practice at Cluny, in Aberdeenshire, from whence he will now depart at once for New Zealand. There were nearly 100 applicants for the position.

Mr. T. Eaton Jones, M.R.C.V.S., Chief Veterinary Officer to the City of Liverpool, has been elected a Member of the Council of the Royal Lancashire Agricultural Society.

The University of Uruguay is about to establish a Veterinary Faculty and a well-equipped Veterinary School. The organisation of the staff has been placed in the hands of Professor Peroncito, of Turin, who will occupy the position of Director and the chair of Parasitology.

At the recent Fellowship Examination held on December 8 the following gentlemen were successful in obtaining the Degree: Captains R. H. Holmes and A. J. Williams, Messrs. G. C. Lowe, Geo. Moir, A. E. Payne and Thos. Parker.

Our distinguished colleagues, Professors Arloing and Kauffmann, the former the Director of the French Veterinary School at Lyons and the latter the Professor of Therapeutics in the Alfort (Paris) School, have been promoted to the grades of Commander and Chevalier, respectively, of the Legion of Honour.

ROYAL COLLEGE OF VETERINARY SURGEONS.

At meetings of the Board of Examiners held in London on December 13 for the written, and on and between December 19 and 21 inclusive for the orals and practicals, the following gentlemen passed their final examination:—

Mr. L. S. Balls
„ W. J. Blackwell
„ H. Bone
„ P. Carter
„ J. R. Crane
„ A. F. Castle
„ C. Hartley
„ F. E. Jones
„ P. G. Ledger
„ G. T. Matthews
„ R. C. Moore
Mr. E. R. Nicholls
„ W. J. Phillips
„ D. B. Rodger
„ S. Smith
„ E. H. Strachan
„ J. H. Thomson
„ W. D. Williams
„ C. P. Wellington
„ J. B. Welham
„ F. Ware

The following passed their third examination:—

Mr. J. M. Armfield
„ L. B. Cole
„ R. Gooderidge
„ H. M. Holland *
„ W. Jones
„ P. J. O'Brien
Mr. D. Okell
„ A. J. S. Reynolds
„ H. W. Townson
„ W. F. L. Bright *
„ H. R. Singleton

The following passed their second examination:—

Mr. T. F. Addison
„ J. D. Broome
„ J. B. Buxton
„ A. W. Brasnett
„ J. R. Conchie
„ H. V. Dier *
Mr. N. B. Francis
„ G. N. A. Hall
„ G. L. Y. Ingram
„ F. Marks
„ E. P. Offord
„ V. Pride-Jones

The following passed their first examination:—

Mr. J. Bott
„ A. W. Carter
„ H. A. Coomber
Mr. L. H. Leach
„ R. Moore
„ S. C. Rowbotham

* Passed with 2nd Class Honours.

Reviews.

Veterinary Toxicology. By Col. J. A. Nunn, C.B., Army Veterinary College, &c. Published by Messrs. Baillière, Tindall and Cox, London. Pp. vii. + 191. Price 5s. net.

For many years a growing want has been felt among practitioners of veterinary medicine for the appearance of a handy text-book on the subject of poisoning in the domesticated animals.

Colonel Nunn, in his recently-published work on veterinary toxicology, has done good service in this direction, and the little volume should be of valuable assistance to practitioners and also to students. The subject-matter is not original, the book being a compilation of a number of papers on the subject which have already appeared in the Veterinary Journal, and have now, for the first time, been published in book form. The work consists of seven chapters, and the classification of the poisons has been carefully arranged. Each one is studied

in the same particular manner as to source, symptoms, *post-mortem* lesions, treatment and analysis. More information might have been given regarding differential symptoms exhibited by the different animals when poisoned by the more common drugs.

A large amount of space has been devoted to analyses, and a careful perusal of these portions of the work will give the reader a good deal of information of practical value. For instance, when dealing with phosphorus we read: "Great care must be exercised in making the *post-mortem*, and the various organs or tissues should be examined in the dark, as they may be luminous, which would be a valuable indication, together with the smell of garlic from the contents of the intestines and stomach.

"The analysis is based on the following facts:—(1) Phosphorus, if it has not been transferred into phosphates, is taken up by steam, when a solution is distilled, and this steam will be phosphorescent in the dark. (2) Certain substances, such as alcohol, turpentine, ammonia, sulphuretted hydrogen, phosphoretted hydrogen, and carbon sulphide destroy this appearance. These facts show that in testing for this poison (*a*) the necessity of being certain that turpentine has not been employed in the case; (*b*) that the suspected material has not been preserved in alcohol."

Where the author has obtained his material from continental sources, he has retained the metric system in giving dosage. It would have been an improvement if the dosage had also been given in English measures, say in parentheses after the original.

Colonel Nunn has succeeded in compressing much useful work into a small space.

The publishers' part of the work is performed in their usual good style.

NOTES ON SERUM THERAPY, PREVENTIVE INOCULATION, AND TOXIN AND SERUM DIAGNOSIS. By Walter Jowett, F.R.C.V.S., D.P.H., formerly Demonstrator of Comparative Pathology and Bacteriology in the University of Liverpool. Published by Messrs. Baillière, Tindall and Cox, London. Pp. x. + 200, forty-seven illustrations. Price 5s. net.

THIS little volume consists of a compilation of the latest work of many investigators on the subjects forming the title of the book. The author is endowed with a power of very lucid description, and, as a consequence, both practitioners of long standing, who may have allowed themselves to fall out of touch with recent research, and students alike will be able to follow intelligently the accounts given of subjects, some of which are by no means easy of description.

The first chapter deals with immunity, and details the various theories put forward to explain it, including Metschnikoff's Phagocytosis Theory, Erlich's Lateral Chain Theory, and the Opsonic Theory of Wright. Having detailed what is known of immunity, the author next proceeds to describe the various methods of conferring immunity in general, and follows this with particulars in the various diseases against which artificial immunity may be produced, such as anthrax, black quarter, tetanus, &c., of those caused by visible bacteria; and rabies, variola, foot and mouth disease, rinderpest, South African

horse sickness, &c., of those caused by ultramicroscopic organisms. This part of the work, like the rest, is up to date, and includes an account of the recent work in swine fever, which is now known to be due to an ultramicroscopic organism, on braxy and louping-ill, and on von Behring's and others' attempts to produce immunity against tuberculosis.

Chapter IV. contains a brief account of the diseases due to various protozoa, such as the piroplasmata, trypanosomata, and the spirochætes.

Chapter V. describes the methods of preparation of tuberculin and mallein, and of their application as a test for their respective diseases. The agglutination tests are also described, and so are the precipitating sera used in the inspection of meat.

The book contains two useful appendices on "Notifiable Diseases" and "Weights and Measures," and concludes with a reprint of the author's original notes on the occurrence of spirilla in equine canker and grease.

Mr. Jowett has succeeded in compiling for us a most interesting and instructive little book, which we have no hesitation in recommending to both practitioners and students.

The printing is good and easily read; the binding is fair.

THE SURGICAL ANATOMY OF THE HORSE. Part I. By J. T. SHARE-JONES, M.R.C.V.S., Lecturer in charge of the Department of Veterinary Anatomy in the University of Liverpool. Demy 4to., pp. 159; 7 coloured illustrations, and 26 black and white ditto. Subscription for four parts, cloth, £3; sewed, £2 14s. Published by Messrs. Williams and Norgate, London.

THIS is the first of four volumes on the above subject, and deals with surgical areas and operations of the head and neck. As the author indicates in the preface, there has been no connecting link between anatomy and surgery as taught at present in the schools, and his endeavour is to supply this want. The aim of the work is to consider only such portions of anatomy as are concerned in the practice of surgery. There is undoubtedly much room for such a work, which might be useful to students and practitioners alike.

In dealing with the subject the author describes the points which can be either felt or seen on superficial examination and manipulation, and the relative positions of the various structures involved in the surgical diseases of the areas, with the operations devised to relieve them.

When considering the superficial examination of the head or neck it is difficult to avoid confusion unless the direction of the long axis of the head or neck be first indicated. This omission on the part of the author occasionally causes the reader some difficulty in following the description; for example, in Chapter I. he describes the main points of the skull in the vertical position without first indicating his intention to regard it as being so placed, while in Chapter II. he describes a longitudinal sagittal section, and here indicates the position for descriptive purposes as being horizontal. The descriptions of the glottis and epiglottis on page 14 are somewhat loose; the glottis is not the pharyngeal opening of the larynx, but lies posteriorly, and is bounded by the

arytenoid cartilages and the vocal cords. Moreover, each side of the epiglottis is concavo-convex, but in different directions.

Eight of the large pages of text, one large coloured plate, and three the same size in black and white, are devoted to the description of the gutteral pouches and the operation of hyovertebrotomy. This seems to us a waste of space and labour, as this operation is probably not performed or called for once on an average in a practitioner's life. On page 83, in describing the operation of hyovertebrotomy, the author says, "Fleming and Lecocq recommend the piercing of the stylo-hyoid muscle. Möller and Dollar pierce the occipito-styloid." We are of opinion that the above two names are meant to indicate the same muscle, being synonyms according to the terminology employed. (See Table of Synonyms of muscles, prefaced to "The Anatomy of the Horse," by M'Fadyean). The coloured plate could have been better employed to illustrate the region of the poll, in which position we are frequently called upon to operate.

Again, we consider coloured Plate VIII. quite useless, and also wrong in some of its relationships. It indicates a section through the base of the neck, seventh cervical vertebra, and to us conveys no useful information for ordinary operative purposes. Moreover, the longissimus dorsi is not shown, whereas it extends from the back as far forwards as the third cervical vertebra. The longus colli muscle clothes the sides as well as the under aspect of the body of the seventh cervical vertebra, and separates the vertebral vessels from the bone. In the plate mentioned the vessels are shown in contact with the bone.

The plates for the most part are very good, especially the coloured ones of the neck, and the half-tone plates of the skull. Plate XVIII., however, conveys nothing to us; it is impossible to make out the relationships of the gutteral pouch or anything else from it. The region of the head and neck is certainly difficult to deal with, and we shall look forward to seeing the limbs treated of in the next two volumes. The author will have better opportunity there of giving us more useful plates for everyday practice.

There are several serious errors, which will need to be corrected in a future edition, in two tables of muscles and nerves at the end of the book. The nerve supply of the masseter, the mylo-hyoideus, and the pterygoideus internus, muscles is said to be from the *superior* maxillary division of the fifth nerve (pp. 150 and 152), whereas the *inferior* maxillary division in reality supplies them. On page 158 there is indicated an inferior branch from the *motor root* of the fifth cranial nerve. The nerves which in the table are comprised within that branch (viz., the infra-orbital, &c.) are derived from the *sensory root*, and are given off by the superior dental branch of the superior maxillary division of the fifth nerve. On page 159 the *lingual* nerve is said to be the twelfth cranial and a *motor* nerve—it should be the *hypoglossal*. The lingual is a *sensory* nerve, and is synonymous with the gustatory nerve, which is derived from the inferior maxillary division of the fifth cranial nerve. Again, on the same page, the *portio dura* or seventh cranial nerve is said to be *sensory*, whereas it is almost exclusively a *motor* nerve.

Other mistakes are not infrequent, *e.g.*: the internal maxillary and the ophthalmic arteries are stated to pass out of the foramen rotundum instead of the subsphenoidal canal; the anterior aorta is

described as extending forwards to the first pair of ribs; and the tushes are stated not to be changing with age except in colour, &c.

The author has endeavoured to fill a long-felt want, and we are sure that the book will well repay careful study before embarking upon any of the less common operations of the head and neck. The work of the publishers is excellent.

PRÉCIS DE COURS DE PATHOLOGIE CHIRURGICALE (Hand-book of Surgical Pathology). By M. HENDRICKX, Cureghem Veterinary School, Brussels. Two vols. Published by Messrs. Vromant and Co., Brussels.

THE book is in two parts, the first deals more with general pathology and is subdivided into three headings: (1) Œdema, Contusions, Inflammation, Abscess, Ulceration, Fistulæ, Gangrene, Furuncles, Tumours, Cysts. (2) Hernia, Eventration, Prolapsus, Volvulus, Invagination, Luxation, Ankylosis, Sprain, Deviation, Contraction, Dilatation. (3) Wounds, Rupture, Fractures.

There is also a chapter on burns, frost bites, foreign bodies, congenital deformities, and abnormal movements. The second portion is devoted to special diseases and accidents of the different regions of the body. These are described in a clear but concise manner, the details being fully entered into. A novel plan has been introduced by Professor Hendrickx, by interleaving each page, so as to allow of notes being taken of interesting cases. The work completes that of M. Hebrants, and the two form a complete one on general pathology.

PRÉCIS D'EXTERIEUR DU CHEVAL ET DES PRINCIPAUX MAMMIFERS DOMESTIQUES (Exterior of the horse and principal domestic animals). By Professor F. X. Lesbre (Lyons). One volume, 453 pp., 280 illustrations. Published by Messrs. Asselin and Houzeau, Paris, 1906.

ON the Continent the "*Exterieur*" comprises the applied study of the external characteristics of the domestic animals.

M. Lesbre commences his book by giving the definitions of certain expressions and the connection which, in other sciences, the exteriors of the domestic animals bear in relationship to them.

In the first chapter he treats of the age. After describing the general character and structure of the teeth, he goes on to the changes they undergo, "especially the lower incisors," by which the age can be determined, and in connection with this section the irregularities and abnormal conditions that may exist which obscure or render it impossible to arrive at a correct estimate, also the fraudulent means adapted to make animals appear younger than they really are. The chapter concludes with the dentition of the ass, mule, ox, sheep, goat, camel, llama, pig, dog, and cat. The method of estimating the age of the ox by the horns is also mentioned.

The second chapter describes the coat (*Robe*), with the peculiarities and marks seen in the horse and other animals, the height and means of judging it, and the correct description (*Signalement*) of an animal.

The third and fourth chapters are on position (*Aplombs*), attitude and paces. The influence that position effects is discussed, also the

problem of motion and animal mechanics, and the terms known to horsemen as the "good" and "bad" points.

The fifth chapter is the longest, taking up nearly half the book; it is devoted to the different regions of the body, each being studied first in connection with the whole animal machine, and then separately, from an anatomical and physiological point of view, their good and bad points, and the compensating value of them. A separate section of this chapter deals with the ass, mule, ox, sheep, goat, pig, dog and cat.

Chapter six is on the proportions of the various parts of the body, and the various theories that have been deducted from them. Bad and good proportions are fully considered, together with the influences they bear on one another. The author points out the great importance of having the various regions of the body properly proportioned.

The seventh and eighth chapters discuss the important and practical matters of selection of animals for different purposes, examination of animals offered for sale, and fraudulent practices.

M. Lesbre's book is written in a methodical manner in clear, concise language, and can, with advantage, be perused with the works on the same subject by Goubaux and Barrier and Montane; it has the advantage over them in not being simply confined to the horse.

The book is well got up and printed, the drawings clear, well executed, and illustrative of the subject matter; it is well worth reading, not only by veterinary students and practitioners, but by all interested in the domestic animals.

PROFESSOR DR. KITT, LEHRBUCH DER PATHOLOGISCHEN ANATOMIE DER HAUSTIERE (Handbook of Veterinary Pathological Anatomy). Second vol. of third edition, 754 pages, 213 illustrations and three coloured plates. Published by Messrs. Enke and Co., Stuttgart. Price 18s. 9d.

THE first volume of the third edition of Professor Kitt's clinical work was brought out a short time ago, the present one completes the work.

This volume deals with the changes and lesions of the intestines, nostrils, sinuses of the head, larynx, trachea, bronchi, lungs, pleura, heart, pericardium, blood and blood vessels, spleen, lymphatic vessels and glands, thyroid, thymus, suprarenal capsules, kidneys, ureters, bladder, urethra, male and female genital organs, nerve centres and nerve trunks, ears, eyes and feet.

Under the heading of alterations in the blood the author has classified infectious diseases and given a brief description of the blood parasites and the changes they give rise to.

Certain portions have been contributed by specialists: for instance, Dr. Jakob has written the portion dealing with the eye, and Professor Gatenäcker that on the foot of both the horse and ox.

The work of the eminent Munich Professor is a classic in veterinary literature, and the coloured plates are works of art; it would be impossible to give more life-like representaions.

GLASGOW VETERINARY COLLEGE.—PROPOSED CHANGES IN ADMINISTRATION.

As far back as 1860 the Glasgow Veterinary College was founded by Principal M'Call, the present head of the institution, and as a private institution under his superintendence it has continued ever since. Looking to his advancing years, and to the changes which have come over other veterinary colleges in the intervening years, Principal M'Call is now desirous that the Glasgow School should be placed under a body of governors, and should thus cease to be conducted as a private institution.

The Highland and Agricultural Society have applied to Government for a grant in aid of veterinary teaching in Scotland, and no doubt the Edinburgh Veterinary College will receive a proportion, if not the whole, of that grant, as the Glasgow Veterinary College, so long as it remains a private institution, cannot be regarded as eligible for a grant.

The aims of the present movement, the affiliation of the Veterinary College with the University, and the passing of an ordinance establishing veterinary degrees, are held to be fair possibilities under the proposed scheme of public administration.

Since 1900 there has been a steady increase in the number of students in attendance at the College until the number has reached 76, and there are indications of further support, which are held to be quite sufficient to justify the maintenance of a separate veterinary college in the city.

Between 60 and 70 per cent. of the students enrolled in the College at the present time are young men belonging to Glasgow and the surrounding counties, many of whom travel regularly from their homes to attend the college classes.

(*Glasgow News.*)

NUMBERS OF LIVE STOCK.

For the United Kingdom as a whole, there has, from the initial year (1876) to the closing year, been an increase of 13 per cent. in the number of horses returned, which have never been over two million in the first half of the period, and never under two million in the second. There is a rise of nearly 17 per cent. in the cattle, the latest two years with 11,576,000 and 11,674,000 respectively showing the highest totals, although the figures were nearly approached once before, in 1892. Against this improvement has to be set a fall of 9½ per cent. in sheep, and it is to be remembered that the flocks of the United Kingdom have in the interval between 1876 and 1905 fluctuated widely—exceeding 32,000,000 in the first four years—falling to a minimum of 27,448,000 in 1882—rising thence in ten years' time to a maximum of 33,643,000 head in 1892, and again declining to little over 29,000,000 last year. There is a further loss, comparing 1905 with 1876, of 3½ per cent. on swine. But the curve described by the fluctuating numbers of the pigs is a very irregular one, the lowest point being touched

in 1880 with 2,863,000 head, and the highest ten years later, when a total of 4,362,000 was recorded—so that the stock of 1905 is just half way between the two extremes. From the commencement of the agricultural returns it has been recognised that the annual enumeration of the flocks and herds of the country was a duty equally, if not more, urgent than the record of the changing areas of the different crops. The material advance in the number of cattle maintained, which the annual statistics have disclosed, has been the subject of frequent reference and congratulation, in view of the importance attaching to the meat supply of a population like our own, which not only increases steadily in numbers, but apparently also, in proportion to its improving economic conditions, in capacity for meat consumption. It has been thought interesting to repeat on this occasion the analysis made in 1896 of the local distribution of the live stock in different categories in June in proportion to the areas of the several counties. This is set out in Table VIII., and, broadly speaking, shows on every 1,000 acres of the surface of Great Britain 123 head of cattle now, as against 114 in 1896, and 445 head of sheep against 470. The change shown is thus nine cattle more and 25 sheep less on each 1,000 acres of territory. It will be seen on reflection that this is on the whole a net advance, and not a retrogression, for the equivalent loss in meat produced, denoted by the reduced flocks, is outweighed by the gain on the heavier class of live stock.

(*Farm and Home.*)

Translations and Extracts.

CANCER OF THE BLADDER IN A MARE.

EBERSBERGER (MUNICH).

THE patient, 8 years old, which was in good condition, was brought to the surgical clinic of the Munich Veterinary School, as for some time previously she had been constantly passing urine in small quantities.

According to the owner's statement, she was in foal. Examined by the vagina a tumour was detected on the floor the size of a child's head, which was the diseased bladder. Two fingers could be passed through the urethra, and when they were withdrawn they were covered with necrosed tissue of a greyish-brown colour, pliable in consistency and with an ammoniacal smell. When the urethra was irritated a small quantity of cloudy urine of a dirty grey colour, mixed with blood and having a putrid smell, was ejected.

The case was diagnosed by Professor Imminger as one of cancer of the bladder, and an operation was decided upon. The patient was placed under an anæsthetic and the urethra incised, but it was impossible to get the hand into the bladder. It was, however, recognised that the whole organ was implicated, as well as the neighbouring tissues. Two fragments, the size of the fist, were broken off with the fingers,

and on microscopic examination found to be a carcinoma. The case being hopeless the animal was destroyed.

The bladder measured 17 centimetres by 14 across the fundus, and the wall was 6 in thickness. The mucous membrane was studded over with grey and pink marbled patches 3 to 4 millimetres in diameter, and there was a transverse patch caused by the infiltration of the tissues with urinary salts.

To the right of the fundus an enlarged gland the size of a nut was found under the serous membrane, and there was a patch the size of a five-franc piece to the left and behind the umbilicus. In the neighbourhood of the kidneys there was a hard adherent scirrhous tumour the size of a man's fist, and the neighbouring glands were involved. There were about twenty others, varying from the size of a nut to a hen's egg, in the liver, mesentery and spleen.

Cancer of the bladder is not so very uncommon. Professor Imminger has seen several cases, but up to the present the subjects have always been aged animals.

Wochenschrift für Tierheilkunde.

INTESTINAL CONGESTION IN THE HORSE AND ITS THROMBO-EMBOLIC ORIGIN.

BY A. COQUOT AND J. BASSET.

INTESTINAL congestion in the horse has been described as "a large red infarction," due to total obliteration of one of the cardiac arteries by the formation of a thrombus.

Closer examination, however, shows that if intestinal congestion is an infarction the lesion, on account of the anatomical disposition of the arteries, would not be larger than a shilling. On the other hand, statistics show that congestion of the intestine is comparatively rare, while aneurism of the mesenteric arteries is common, and the authors have seen many cases in which there were large thrombi, while the colon was perfectly healthy. They also ligatured the artery, but no signs of intestinal congestion were observed.

(*Recueil de medecine Veterinaire*).

STERILITY AND ABORTION IN COWS FROM INFECTIOUS CATARRH OF THE VAGINA AND UTERUS.

BY PROFESSOR DE BRUIN (UTRECHT).

THE author has seen numerous cases of sterility in cows in the neighbourhood of Utrecht, which he attributes to infectious catarrh of the uterus and vagina. The disease may take an acute or chronic form, and is first seen about the third month of gestation.

In the acute form there is great congestion of the mucous membrane

at the entrance of the vagina, and the labia are much smaller, and covered with a variable number of small granulations about the size of a pin's head, which are characteristic. In the early stages there is simply an increased flow of mucus, but this soon increases, becomes thickened, and even purulent.

The best time to detect the earlier symptoms is the first thing in the morning before milking, and if the cow has not passed any urine for some time the discharge of mucus will be detected. It will also be seen if the animal is made to walk a short distance.

The condition early becomes chronic, coupled with endometritis. Ostertag attributes it to a diplococcus and a short streptococcus.

The disease is established to be highly contagious, and can be reproduced by direct inoculation from one cow to another through the medium of the bull, although he to all appearances is healthy, being merely a carrier of the virus. Although it is usually through the medium of the bull that cows are infected, the disease can be spread by other means, such as the hands of the attendants.

The consequences are sterility and abortion. De Bruin admits Zschokke's theory of spasmodic contraction of the os as an explanation of the former.

In some cows abortion takes place between the sixth and ninth week, and is called in Dutch "opbreken"; in others between seventh and eighth month, "verwerpen," and both forms are very prevalent about Utrecht.

De Bruin has noticed that in localities where vaginal catarrh in cows is prevalent there is a high mortality in calves from diarrhœa, if strict disinfection of the cord at the moment of birth is neglected.

He recommends astringents, such as a 2 per cent. solution of alum, 1 to 2 per cent. creolin, 10 per cent. ichthargon, or 1 per cent. nitrate of silver, applied on pledgets of tow, retained in position for from half to one hour.

(*Tydsschrift voor Veeartsenijkunde.*)

CONTAGIOUS PARAPLEGIA IN THE HORSE.

SORRIAU.

INFECTIOUS or contagious paraplegia, which has been described by several authors, may be seen in forms that differ from the usual, and which are misleading. It only differs from hæmoglobinuria by being contagious, the way it commences, and the results of treatment. It may be malignant, benign, acute or sub-acute.

In the sub-acute form the animal suddenly falls down. In some cases he assumes the position of a horse with acute laminitis in both fore feet. If down, attempts to lift him up are useless, he is exhausted, covered with perspiration, mucous membrane injected, and he dies in a few hours.

In the acute, malignant form, the commencement of the attack is the same, the animal falling, getting up, then stumbling on a few steps and falling down again, but the hind quarters are only paralysed later on in the attack. The patient makes violent efforts to rise; the body is

covered with perspiration, and the mucous membranes deeply injected, but they regain their normal colour as the case recovers; the appetite remains good. After three or four days the animal dies, exhausted by efforts to get up. If put in slings he is generally able to stand fairly well. The urine is viscid, and of a dark brown colour. A recovery may be looked for in from two to six weeks, but the patient must be kept in the slings for some time after an apparent recovery, or he is liable to fall and injure himself.

In the benign form the commencement of the attack may pass unnoticed; all that is seen is that urine is more frequently passed, the limbs are somewhat stiff at the commencement of work, and there is difficulty in getting up. Mares and young horses are more frequently attacked than older animals.

The disease is certainly contagious, and the urine is the vehicle. The walls of the bladder are coated with sero-purulent matter, which makes the urine turbid, and when it becomes clear the contagion disappears. Litter soiled with infected urine is a fruitful source of the spread of the disease.

There is great congestion of the benign mucous membrane of the bladder, which is thickly coated over with a sero-purulent discharge. In one case that died on the 15th day, the grey matter of the spinal column liquified in the lumbar region, and formed a thick grey-coloured fluid containing particles of the cord floating about in it. The white substance and meninges were intact.

The difference from Lathyrism, in which there is roaring, epizootic meningitis, in which the face has a stupid expression, the jaws contracted and loss of appetite, and hæmoglobinuria, in which the urine is high coloured, is so marked that it is impossible for confusion to take place.

Preventive measures consist in removing the sick from the healthy, disinfecting the stables, and providing separate attendants. The author also recommends bleeding the whole of the stud.

Animals that are down must be got on their feet and supported in slings. Drugs he finds of little use, but galvanism over the loins in the author's cases has given excellent results.

(*Journal de Medecine Veterinaire et de Zootechnie.*)

New Instruments and Appliances.

IMPROVED GAG FOR HORSES.

Messrs. Arnold and Sons, London, have recently manufactured, for the Army Veterinary Service, a mouth gag, which differs markedly from other patterns on the market. The principle on which it works is the same as seen in Gunther's Gag; but the construction has been so improved that it is much lighter, simpler, and more portable than any previous model.

The officers who are responsible for the design have subjected the instrument to the most severe and prolonged tests before adopting it, and they are satisfied that it is a great improvement on anything they have hitherto used.

Two plates, shaped to receive the incisor teeth, are rigidly connected by a metal frame, down the uprights of which the lower plate slides. The plates, closed together, are inserted between the teeth; the lower

is gradually separated from the upper by means of a thumb-screw, and the mouth opened to any extent required. The ease and humanity with which the operation can be carried out, and the ample room for manipulation which the instrument provides, are distinctly in its favour when compared with other patterns.

Books and Periodicals, &c., Received.

Veterinary News; Hermite Electrolytic Process at Poplar (Dr. Biggs, M.O.H.); Horses in Health and Disease (Frank T. Barton, M.R.C.V.S.); Transvaal Agricultural Journal; Cape Colony Agricultural Journal; Notes on Blood-Serum Therapy (W. Jowett, F.R.C.V.S., D.V.H.); Western Veterinarian; Report of the Veterinary Director-General of the Department of Agriculture of Canada; Journal of the Royal Army Medical Corps. Text-Book of Comparative Pathology (Kitt).

Letters and Communications, &c.

Dr. Biggs; Mr. Livesey; Mr. Gooch; Dr. F. Batten; Colonel Nunn; Mr. Tait; Mr. Taylor; Mr. Gibbings; Professor J. McCall; Mr. A. Hill; Mr. A. S. Hodgkins; Dr. Lingard; Colonel Nunn; Lieutenant O'Rorke; Lieutenant Lane; Professor A. C. Duncan.

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